

**PRE-QUALIFICATION PROGRAM**

Work Type Definition / Submittal Requirements

# Work Type Definition

## 9.1 Geodetic Control Surveying

### Description

Geodetic Control Surveying includes all fieldwork, analysis and office computations necessary to establish monuments statewide (both horizontal and vertical) on the ground and to have said monuments submitted in the proper format to the National Geodetic Survey for inclusion in the National Spatial Reference System and the MnDOT Geodetic database.

1. **LEVEL 1 [Work Type 9.11]:** **Project setup, reconnaissance and monumentation of geodetic control projects.**
   1. Includes all work that is needed to provide proper monumentation from the initial project request, which specifies preliminary project limits.
   2. Fieldwork must be done to determine whether existing control is available and whether existing monuments are suitable or new monuments must be placed.
   3. New monuments must be placed to NGS specifications and original description and recovery information send in to the MnDOT Geodetic Unit on specified forms for updating of the MnDOT Geodetic Database.
2. **LEVEL 2 [Work Type 9.12]: First-order horizontal control field work.**
   1. Includes all aspects of first-order static GPS horizontal control that meets the NGS specifications for inclusion in the NGS database.
   2. The project limits for the fieldwork is determined by the output of Level 1 and will be tied to the High Accuracy Reference Network (HARN) using the North American Datum (NAD83(96)) adjustment.
   3. The fieldwork includes, but is not limited to session planning, scheduling, observing and field processing of raw data to produce an output and documentation that is in an acceptable format (NGS bluebook) for office processing as directed by the MnDOT Geodetic Unit.
3. **LEVEL 3 [Work Type 9.13]: Second-order class I vertical control field work.**
   1. Includes all aspects of second-order class I vertical control fieldwork that meets NGS specifications for inclusion in the NGS database.
   2. The project limits for the fieldwork is determined by the output of Level 1 and field checks of existing control listed below and will be based on the North American Vertical Datum (NAVD 88).
   3. The fieldwork includes but is not limited to checking of existing control, leveling through new and existing monuments and producing data and documentation in an acceptable format (NGS bluebook) for office processing as directed by the MnDOT Geodetic Unit.
4. **LEVEL 4 [Work Type 9.14]: Processing of raw field data and submission of final report to the NGS, District and Geodetic Unit.**
   1. Includes processing of field data from Level 2 and Level 3 and information provided from Level 1 to produce final coordinates and elevations that meet NGS specifications.
   2. The office processing includes but is not limited to adjustment of data, running of NGS check programs of data and submission of all aspects of a paper report to the above described parties and electronic files to the NGS and MnDOT for inclusion of this information into the NGS and MnDOT database.
   3. The report and electronic files must be in a format as directed by the MnDOT Geodetic Unit.

### Standards and Specifications

Standards and specifications required for a project under this work type may include the following:

1. The survey data must be properly formatted as set forth by the Federal Geodetic Control Subcommittee (FGCS) and meet the minimum requirements of:
2. First-order horizontal accuracy standards for Global Positioning Surveys (GPS).
3. Second-order, class I vertical standards for conventional geodetic leveling.
4. These data standards and accuracies must be verified, using currently available NGS software, by the provider prior to submitting the survey project to the NGS. It must also be in format suitable for populating the MnDOT database.
5. All work must be performed in accordance with MnDOT and NGS standards and according to supplemental standards in individual contracts.

### Provided by MnDOT

Information to be supplied by MnDOT for a project may include the following:

1. MnDOT Geodetic Database
2. MnDOT Surveying and Mapping manual, Chapter 2
3. MnDOT Geodetic Unit Database Documentation 2000
4. Input Formats and Specifications of the National Geodetic Survey (NGS) Database (September 1994) (updated 1998, 2000)
5. Standards and Specifications for Geodetic Control Networks (1984)
6. Geometric Geodetic Accuracy Standards and Specifications for using Global Positioning Surveys (GPS) Relative Positioning Techniques (May 1988)
7. National Oceanic & Atmospheric Administration (NOAA) Manual National Ocean Service (NOS) National Geodetic Survey (1978)
8. Coast and Geodetic Survey Special Publication 247 (1950)
9. [NGS World Wide Web Home Page](http://www.ngs.noaa.gov/)

### Provided by Consultant

Deliverables to be supplied by the consultant for a project may include the following:

1. Geodetic Control Survey Report including all required data and analysis.
2. Specific examples of deliverables:
3. Project setup, reconnaissance and monumentation of geodetic control projects
4. First-order horizontal control field work
5. Second-order class I vertical control field work
6. Processing of raw field data and submission of final report to the NGS, MnDOT District and the MnDOT Office of Land Management - Geodetic Unit

# Work Type Submittal Requirements

* A consultant firm becomes pre-qualified based on the qualifications of the personnel that are employed by the firm.

| Key Personnel Requirements | Description |
| --- | --- |
| **Minimum Number of Staff** | Geodetic surveying services must be performed under the direct supervision of a Licensed Land Surveyor\* or a Professional Civil Engineer\* and include the following personnel for the level listed:   * Level 1: Project setup, recon, monumentation — 2 members * Level 2: Horizontal control fieldwork — 1 member with the ability to run at least 4 GPS receivers at the same time. * Level 3: Vertical control fieldwork — 3 members * Level 4: Office Processing — 1 person minimum   \* The Licensed Land Surveyor or Professional Civil Engineer can be one of the ‘members’. |
| **Professional Certification / Licensure** | * At least one licensed Civil Engineer or a licensed Land Surveyor with the Minnesota State Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience and Interior Design (AELSLAGID). |

| Work Type Submittal Requirements | Description |
| --- | --- |
| **Resume and Relevant Project Experience Form - Form PQ1**  [Submit in Microsoft Word format] | Complete Parts 1, 1A, 2 and 3 of Form PQ1   * **Part 1:** Fill out general information and names of personnel, including other professional and technical support personnel, and which level they are applying for. * **Part 1A**: Fill out for each person listed in Part 1.   **LEVEL 1 [Work Type 9.11]**   * Experience in the category must be shown by reference to two completed monumentation projects in the last seven years.   **LEVEL 2 [Work Type 9.12]**   * Satisfactory experience must be demonstrated on at least two completed Horizontal Control projects in the last seven years. * Must show demonstrated experience to engage in Control Surveys meeting MnDOT and NGS specifications.   **LEVEL 3 [Work Type 9.13]**   * Experience must be demonstrated on at least two completed projects in the last seven years in the activities required. * Must show demonstrated experience to engage in Control Surveys meeting MnDOT and NGS specifications.   **LEVEL 4 [Work Type 9.14]**   * Satisfactory experience must be demonstrated on at least two completed projects in the last five years that have been accepted by the NGS. * Must have demonstrated experience to engage in Geodetic Control Surveys meeting MnDOT and NGS specifications. * **Part 2:** Project Examples listed must correlate to those described below in “Project Example Requirements”. * **Part 3:** A statement confirming that each qualifying professional or technician has read and understands the following documents for:   **ALL LEVELS:**   * MnDOT Surveying and Mapping Manual, Chapter 2 * MnDOT Geodetic Unit Database Documentation 2000 * Standards and Specifications for Geodetic Control Networks (1984) * Geometric Geodetic Accuracy Standards and Specifications for using Global Positioning Surveys (GPS) Relative Positioning Techniques (May 1988) * NGS World Wide Web Home Page at http://www.ngs.noaa.gov   **Also for LEVELS 1 AND 4: [Work Type 9.11 and 9.14]**   * National Oceanic & Atmospheric Administration (NOAA) Manual National Ocean Service (NOS) National Geodetic Survey (1978) * Coast and Geodetic Survey Special Publication 247 (1950)   **Also for LEVEL 4: [Work Type 9.14]**   * Input Formats and Specifications of the National Geodetic Survey (NGS) Database (September 1994) (updated 1998, 2000) * MnDOT Geodetic Database |
| **Project Example Requirements**  [Submit in PDF format] | Project Example Requirements per Level:   * **Level** 1 **[Work Type 9.11]** * Each qualifying professional staff must submit at least two existing monumentation project reports, which may include scope, field records, field notes, sketches, photos, and other relevant items within the last seven years. * Must have demonstrated experience to engage in Geodetic Control Surveys meeting NGS specifications. * Must have sufficient technically qualified personnel and expertise in Geodetic Control Surveys and NGS specifications to meet requirements in a timely fashion. * **Level 2 [Work Type 9.12]** * Each qualifying professional staff must submit two existing Horizontal Control project reports within last seven years. Reports may include scope, field records, field notes, sketches, photos, and other relevant items. * **Level 3 [Work Type 9.13]** * Each qualifying professional staff must submit two existing Vertical Control project reports within the last seven years. Reports may include scope, field records, field notes, sketches, photos, and other relevant items. * **Level 4 [Work Type 9.14]** * Each qualifying professional staff must submit two project reports within the last five years accepted by the NGS. Reports may include scope, field records, field notes, sketches, photos, horizontal adjustments, vertical adjustments, quality control checks used, and other relevant items. These submittals must show competence and experience in the use of current NGS suite of software programs including ADJUST and WDDPROC. |
| **Proof of Certification / Licensure** [Submit in PDF format] | Provide current copies of the applicable Professional Certification/ Licensure. |

| Work Type Submittal Instructions | Description |
| --- | --- |
| **Instructions for Submittal**  [Each file should be saved in the format identified.] | Submit **5** flash drives that include the following individual files or folders in this order:   * Resume and Relevant Project Experience Form - Form PQ1 [Submit in Microsoft Word format] * Project Example Requirements [Submit in PDF format]   This should be a folder that includes individual files clearly named according to Part 2 of Form PQ1.   * Proof of Professional Certification/Licensure [Submit in PDF format] |