

JULY 1, 2001

**MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF LAND MANAGEMENT
SURVEYING AND MAPPING SECTION
PHOTOGRAMMETRY UNIT**



SPECIAL PROVISIONS FOR:

**GROUP 2: ANALYTICAL PHOTOGRAMMETRIC
PRODUCTS AND SERVICES**

***PLANIMETRIC FEATURE COMPILATION
(ALL VISIBLE FEATURES)***

INTRODUCTION

This Specification is established to provide the Minnesota Department of Transportation (MN/DOT) with “Photogrammetry Products and Services” from Private Photogrammetric Partners (Contractor).

SCOPE OF WORK

These Specifications set forth the minimum standards to be met and general procedures to be followed to extract cultural features from aerial photography using stereo compilation. “Stereo compilation” is further defined as the preparation of large scale, photogrammetrically prepared engineering maps which will be used on MN/DOT’s Microstation system for highway and structure design.

Specific photogrammetric services authorized by this specification include the following:

- Collection of planimetric (cultural) features (all specified identifiable features inside the mapping limits).

ITEMS PROVIDED AND/OR COMPLETED BY MN/DOT

Specific information to be supplied for each project includes the following:

- Work Order Contracts. Each Work Order Contract will include the following information:
 - Project designation or numbers.
 - Project location.
 - Project limits.
 - Map Scale.
 - Active Angle.
 - Units of measurement.
 - Coordinate Datum/Projection/Adjustment.
 - Match File Requirements.
 - Specific Project Deliverables.
 - Deliverables Schedule/Evaluation.
 - List of materials that will be provided by MN/DOT.
 - Special Requirements.
 - Start date.
 - Completion date.
 - Invoice, Incentive/Disincentive Schedule.
 - Total project cost payable to Contractor.
- Contact Prints.
- Mapping Limit Diagram.
- Project Seed Files.
- Mn/DOT Photogrammetric Cell Library.
- Mn/DOT Custom Line Style Resource Files.
- Mn/DOT Digital Map Symbols Manual.
- List of photo control points.
- List of analytical control points, if aero-triangulation solution is provided.

Please be advised: it is the Contractor’s responsibility to provide safe storage and prompt return for all items supplied by MN/DOT. The Contractor is liable for lost or damaged items.

DELIVERABLES BY CONTRACTOR

Specific deliverables authorized by this specification include the following:

- Cost estimate for each project.

- Monthly progress reports.

TEST AREA

- For: preliminary evaluation of map content, feature portrayal, format, symbology, and level placement.
- Test Area mapping is due 7 calendar days from the start of map compilation.
- The Contractor will provide the name and phone number of the primary contact person for the test section.
- Specific Deliverables:
 - 2D planimetric file of test area.
 - diapositives of test area.
 - contact prints of test area.
 - aero-triangulation solution, if completed under Work Order Contract.
- Files may be delivered on floppy diskettes, zip diskettes or CD's.

FINAL SUBMITTAL

Materials to be provided after acceptable correction of compiled mapping, as directed by MN/DOT, if required.

- Approved map files in Microstation Design File format. Production and delivery of 100% clean, edited digital data in Microstation Design File format is required.
- A "File Limits Diagram" will be produced, showing the limits, boundary and name for each project file.
- Files may be delivered on zip diskettes or CD's.
- All point marked diapositives utilized as part of the project. Diapositives will be packaged and delivered flat.
- All contact prints, annotated with control data, which were utilized as part of the project. Contact prints will be packaged and delivered flat.
- Aero-triangulation solution, if completed under Work Order Contract.

PERFORMANCE BASED SPECIFICATIONS

All products and services authorized under this specification will be completed in accordance with the MN/DOT MANUAL OF SURVEYING AND MAPPING, Chapter Four (current edition), the MANUAL of PHOTOGRAMMETRY (Fourth Edition) and the following performance specifications:

UNITS OF MEASURE

The default unit of measure is "English".

Files will be compiled with coordinate values to 1/1000 (ft).

Working Units for Microstation Design Files:	Master Units – 1 FT.
	Sub Units – 1.
	Positional Units – 1000.

Metric values shall be converted using the U.S. Survey Foot, if required.

MAP CONTENT/ PLANIMETRIC FEATURES

The default map scale will be 1"=50' for urban areas and 1"=100' for rural areas.

All stereo compilation will show all planimetric features that are specified and identifiable in accordance with the current version of DIGITAL MAP SYMBOLS MANUAL, provided by MN/DOT.

ACCURACY STANDARDS

HORIZONTAL ACCURACY**

PHOTO SCALE	95%	100%	REPORTING METHOD
1" = 250'	<1.0' of true ground location	<1.5' of true ground location	NSSDA (tested by MN/DOT)
** Scope: "well-defined" map features. Completeness of planimetric content will be checked by MN/DOT by comparing map manuscripts against the aerial photography utilized for compilation.			

PROCEDURAL BASED SPECIFICATIONS

All products and services authorized under this specification will be completed in accordance with the following procedural specifications and as directed by the Photogrammetric Engineer:

GENERAL

Where these specifications, the Work Order Contract and contract documents describe portions of the work in general terms, but not in complete detail, it is understood that only "Best Industry Practices" are to prevail.

EQUIPMENT

The stereo plotter(s) used to complete the project will be the instruments listed in the Contractor's proposal unless specific permission is granted by MN/DOT to use alternate equipment. Any mapping that is completed using non-approved equipment may be rejected and recompiled at the Contractor's expense, as determined by the Photogrammetric Engineer.

The Contractor will validate the calibration of each analytical stereo plotter within 30 days prior to the date of compilation.

DATA FILE FORMAT/REQUIREMENTS

All planimetric map data must be compiled directly in or translated to the Microstation Design File format, Microstation ver. 5.0 or higher.

Microstation Design Files for planimetric mapping will be submitted to MN/DOT as two-dimensional (2D) files. (If planimetric features are compiled in a 3D file, the unedited 3D file will be delivered as a separate file.)

Files will not exceed 15MB in size.

The global origin for the map files will be in the lower left corner of the design plane ((0,0) for 2D files and (0,0,0) for 3D files).

All angle readouts will be based off of the conventional mode and not based on azimuth or bearing.

"MN/DOT mapping file naming standard". The file name will be composed of two alpha characters, followed by the designated MN/DOT State Project (SP) number, followed by a period and three alpha characters designating the map file as planimetric mapping or DTM. The first character of the file ID will always be "P", followed by alpha character "A" for the first file in the project and sequencing alphabetically through the files in the project. The last four characters will be ".PLN" for planimetric mapping or ".DTM" for digital terrain models. Example: PA021406.PLN (SP 0214-06) or PC278250.DTM (SP 2782-50).

The Contractor is required to keep a back up of all electronic files produced for the project for 1 year after final acceptance is made.

PRODUCTION TECHNIQUES

All digital data will be recorded directly as a function of stereo plotter operation. Post compilation digitizing of graphic compilation will not be permitted.

Digital data will be recorded directly as a function of stereo plotter operation. Prior approval must be acquired to compile on a digital workstation.

Planimetric roadway compilation will consist of curve strings and tangent line strings only.

Compilation will be snapped and matched exactly to adjacent map files and other project files provided by MN/DOT.

Mapping limits on each delivery file will be delineated.

PROJECT EVALUATION/ ACCEPTANCE

Within seven calendar days from the start of map compilation, the Contractor will provide materials to Mn/DOT, as specified in "Deliverables by Contractor". MN/DOT will evaluate level assignment, line codes, line weights, text placement, feature symbology, cell rotation, portrayal of features, etc. The Contractor may continue compilation while MN/DOT reviews the map file; however, the Contractor is responsible for all corrective action and modifications required.

Upon completion of project compilation and initial edit, the Contractor will submit the project to MN/DOT for review. MN/DOT will spot check the work and note items that require correction, if any (MN/DOT will not "flag" every item, only representative examples of corrective action required). The Contractor will make a concerted effort find and correct all features not meeting specifications.

MN/DOT will review the "Contractor's Final" delivered map files and will make all necessary edits to bring the project within specification. MN/DOT reserves the right to deduct monies, due to the Contractor, the actual cost incurred to bring a sub-standard project into specification. The cost of corrective action performed by MN/DOT is specified in the Special Conditions.