Survey Manual
Revisions March 2019

Chapter 1

• Page 1-1 – Deleted the following language in the last paragraph under “Section 1.02.1 Authorization”;
  “The integrated Project Manager (iPM) provides a central management system for project development information. In addition to basic location and status information, iPM also includes division-specific comments, project contacts, project documents, meeting dates, project schedule, and action items. It provides direct managerial information on a large number of projects to 12 of the 20+ divisions of the Department, including the Central Office and all 9 Districts and their Residencies.”

• Page 1-2 – Deleted the following language form the top of the page;
  “The two main goals of IPM are:
  • To assist managers in developing realistic and feasible work programs and schedules that are in reasonable balance with resources currently and expected to be available; and
  • To assist managers in completing the work in accordance with approved programs and schedules.

Once a project is authorized to begin, the appropriate starting date must be entered in the IPM database. All VDOT District Survey Managers are responsible for the maintenance of starting and ending dates for the each of the survey-related IPM codes that relate to each project.”

Added the following language at the top of this page;
“VDOT employees will use a variety of programs to manage their projects. Project development information stored in POOL. Project schedules are stored and managed in Project Web Application (PWA). Project estimates are stored in Project Cost Estimating System (PCES). Project documents are currently stored in IPM Documents; however, this will be transitioning to ProjectWise. Most project information can be viewed in Integrated Project Manager (IPM). All of these systems are administered by Central Office, and utilized across all nine Districts and their Residencies.

Projects Schedules are initially determined by the PWA template type that is selected for the project at time of project initiation. Project Managers then have the flexibility to adjust the PWA schedules to more accurately reflect project specific circumstances and expectations. All project tasks are defined in the VDOT PMO Project Tasks and Scheduling Guide. Individual project tasks are assigned to a team member who is responsible to ensure the task is completed. Actual task start and finish dates should be promptly entered into PWA by the Project Manager.”
1. Survey Managers, State Photogrammetry Manager, and the Geospatial Program Manager shall be informed by email of ANY photogrammetric, survey, or SUE work being performed by all primes and/or sub-consultants under any VDOT contract in each respective district prior to commencement of the survey. All photogrammetric, survey, or SUE deliverables shall be submitted to the District and Central office as work is completed via ProjectWise regardless of the contract that it was performed under.

Revised the following language to the third sentence in the first paragraph under “Section 1.02.3 Consultant Assignments” from: “Each consultant is responsible for obtaining Falcon Access for each task…” To: Each consultant is responsible for obtaining “ProjectWise” Access for each task…

Revised the following language in “Items” 1, 2 & 3 from: “State Survey Program Manager” To: “Geospatial” Program Manager.

Page 1-4 – Added the following language after Note #11; “12. District Survey Managers will fill out consultant evaluation forms when requested.”

Revised the following language in “Items” 6, 7, 8 & 11 from: “State Survey Program Manager” To: “Geospatial” Program Manager.

Page 1-5 – Added the following language:

Sec. 1.02.4 Consultant Assignments --- Structure Monitoring

VDOT has a prime consultant available for obtaining services in the field of monitoring deformation of structures. These services are requested through task assignments. Each consultant is responsible for obtaining ProjectWise Access for each task assignment. The task assignment process is outlined below.

[Represents communication protocol to be used]

- Use the UPC first in the subject line of the email.

1. Assignments are initiated at the district or CO level by the Project Manager or other personnel and sent to the Geodetic Survey Engineer or Geospatial Program Manager (CO). [LD forms and email]

2. The Project Manager will contact the Geodetic Survey Engineer with the project information. Information includes: scope of work, UPC#, activity code, Agency One Use code, PM name and contact number, due date, and notice if any consultants have already been on the job.

3. The Geodetic Survey Engineer will assign the task based on the information provided by the district that best fits the Department's business needs.

4. The Geodetic Survey Engineer will contact the Prime for an estimate based on the scope information. [email]
5. The Prime will complete an estimate based on the information provided. The following items should be included in the final estimate:

   a. Narrative letter – includes a detailed scope, VDOT responsibilities (if any), contract MOA date with term, schedule, and deliverables.
   b. Distribution of Man-hours in spreadsheet format –
   c. Fee Calculation work sheet – Limit to 1 page.
   d. Project limits provided by the Department – Sketches, maps, written documentation
   e. Attachments – Should be used for sub consultant’s services.
   f. Any additional documentation if relevant to the task.

6. Prime submits copy of estimate to the Geodetic Survey Engineer. The Geospatial Program Manager will be cc’d with all correspondence. [email] Do not send color files unless Department requests.

- Page 1-6 – Added the following language:

7. Geodetic Survey Engineer is responsible for reviewing and obtaining the Project Managers notice to proceed (NTP). NTP will be forwarded to the Geospatial Program Manager. Project Managers will provide an open activity for the task assignment and must keep it open for the duration of the work. [email]

8. Geospatial Program Manager is responsible for reviewing and giving final NTP to the Consultant.
   c. NTP will be given by email first. [email]
   d. A formal letter will be provided by US mail service to the Consultant. [letter]

9. Consultant will track each task request and provide reports to the Department as requested. [email]

10. If NTP is not received by the Consultant within 2 weeks of submittal, the Consultant will email CO and the District requesting the status of the assignment. [email]

11. Project/Task Manager will review the work for conformance with task request and meets the requirements outlined in the Survey Manual. Geodetic Survey Engineer will notify the consultant and CC the Geospatial Program Manager that the task has been completed, reviewed, and submitted per Sec. 1.08 so the task assignment can be closed. [email]

12. Task Managers will fill out consultant evaluation forms when requested.

Revised the following language in the first sentence under “Section 1.03 Working Hours” from: “Unless otherwise approved by the District Administrator, normal VDOT survey personnel working hours are from 8:00 a.m. to 4:30 p.m. …” To:
“VDOT survey personnel working hours are set by the Department.”
Added the following language at the bottom of the page;  The Land Surveyor Supervisor shall notify the Survey Manager by email or phone where he and the survey party will be working each day.

• Page 1-7 – Revised the following language to “Section 1.04 Daily Diary” from; “Section 1.04 Daily Diary” To; Sec. 1.04 Daily Diary/Field Notes”. Revised the following language in the first sentence under “Sec. 1.04 Daily Diary/Field Notes” from; “A complete diary, which shall be kept by the Survey Party Manager...” To; A complete diary, “also known as Field Notes,” which shall be kept by the Survey Party Manager...

• Page 1-8 – Added the following language to the beginning of “Section 1.08 Submission of Completed of Surveys”; “ProjectWise shall be used for all survey documentation and file storage. Once created all files shall be stored in the ProjectWise environment for the life of the project. Hyperlinks to the information shall be included in the all correspondence. Survey Folders have been created for storage and organizational purposes.” Revised the following language in the third paragraph under “Section 1.08 Submission of Completed of Surveys” from; “…on the appropriate Falcon Document Management server.” To; on the appropriate “ProjectWise” Document Management server. Revised the following language in the fifth paragraph under “Section 1.08 Submission of Completed of Surveys” from; “State Survey Program Manager” To; “Geospatial” Program Manager.

• Page 1-10 – Replaced all of the language in “Figure 1-A” with the following;  

**Surveying Daily Diary or Field Notes**

*The surveyor’s field notes are the permanent written records of the survey taken at the time the work was done in the field. Keep in mind that others may be required to read the field notes and, therefore, care should be taken to ensure that the notes are clear and in a form others can readily interpret.*

*Proper Field Notes should include:*  
  • Only one book should be used per project unless it has been filled. All project field information shall be placed in this book.  
  • First few pages of book remain blank to use as an index  
  • Update index as completed  
  • A double sheet is considered one sheet  
  • Place the number of each page in the extreme upper right-hand side of the page  
  • Type of survey  
  • Record the name and assignment of each member of the surveying party.*
- List of equipment used.
- The date and weather conditions should be recorded at the top right-hand side.
- The note taker should use a 3H or 4H pencil. 2H or ink will smear.
- If an error is made, line through the error. Write in the correct data above the error. Do not erase.
- Data should reflect the degree of accuracy (7.40 is NOT written as 7.4). The decimal point should NOT be omitted.
- If you need to void a page, this is NOT done by tearing it out. The word VOID is written diagonally across the page (or 1/2 page).
- Explanatory notes about a particular reading should be written on the same horizontal line as the reading.
- If calculations on paper are necessary, these should be contained to the back pages of the field book.

- Page 1-11 – Revised “Figure 1-B” to remove all explanations of the “Activity Codes” as well as renaming one and adding new activity codes.

Chapter 2

- Page 2-1 – Replaced the following language in the first sentence in the first paragraph under “Section 2.01 Location Survey Report” from: “Unless specified otherwise by the State Survey Program Manager…” To: Unless specified otherwise by the “Geospatial” Program Manager…

Replaced the following language in the second sentence in the first paragraph under “Section 2.01 Location Survey Report” from: “The Location Survey Report shall be submitted to the District Survey Manager, the appropriate quality control person and cc’d to the State Survey Program Manager.” To: Location Survey Report shall be “uploaded to ProjectWise and an email submitted with a hyperlink” to the District Survey Manager, the appropriate quality control person and cc’d to the “Geospatial” Program Manager.

Replaced the following language in the eighth bullet under the “The body of the narrative…” under “Section 2.01 Location Survey Report” from: “… the State Survey Program Manager’s office” To: …the “Geospatial” Program Manager’s office.

Chapter 3

- Page 3-1 – Revised the following language in the second sentence of the second paragraph under “Section 3.91 Responsibility” from: “This should be reported quarterly to the State Location and Design Engineer.” To: This should be reported “bi-annually” to the “Geospatial Program Manager”.

Page 3-2 – Revised the following language in the last sentence under “Section 3.03 Calculators and Computers” from; “Available programs can be obtained by contacting the State Survey Program Manager…” To; Available programs can be obtained by contacting the “Geospatial” Program Manager...

Page 3-3 – Revised the following language in the third sentence in the first paragraph under “Section 3.06 Periodic Checks of Electronic Total Stations and Accessories” from; “Survey instruments should be serviced and calibrated by a qualified service technician licensed by the equipment manufacturer.” To; Survey instruments should be serviced and calibrated by a qualified service technician licensed by the equipment manufacturer “at least once a year”.

Added the following language in the fourth sentence in the first paragraph under “Section 3.06 Periodic Checks of Electronic Total Stations and Accessories”; “All servicing will be coordinated with Geodetic Engineer Supervisor.”

Revised the following language in the first sentence in the second paragraph under “Section 3.06 Periodic Checks of Electronic Total Stations and Accessories” from; “…a copy to the Survey Program Manager.” To; … a copy to the “Geospatial” Program Manager.

Chapter 4

This chapter was completely rewritten (No shading shown).

Chapter 5

Page 5-1 – Added the following language at the end of the first paragraph under “Section 5.01 General”; “Unless specifically requested by the Department, utilities are NOT to be acquired by aerial photography.”

Revised the following language in the first sentence of the third paragraph under “Section 5.02 Pre-Photography Control” from; “On projects where survey centerlines and/or traverse lines are established on the ground…” To; “On projects where survey traverse lines are established on the ground…”

Revised the following language in the last paragraph from; “…to the State Survey Program Manager and the…” To; …to the State “Geospatial” Program Manager and the…”
• Page 5-2 – Added the following language at the end of the second paragraph under “Section 5.03 Targets”: “White vinyl product for pre-marked aerial targeting also works well, as cloth targeting material may not be available or as economical.”

Revised language in “Figure 5-A Target Dimensions”.

• Page 5-4 – Revised the following language in the first sentence in the third paragraph from: “In most instances, the field survey crew will receive a set of photography, .dgn design files, .pdf files, and/or .kmz Google Earth files from the Photogrammetry Unit.” To: In most instances, the field survey crew will receive a set of “imagery,” .dgn design files, .pdf files, and/or .kmz Google Earth files from the Photogrammetry Unit.

Revised the following language in the third sentence in the third paragraph from: “In other instances, areas will be circled on the photos (usually in grease pencil) for natural image (picture point) location by the field crew.” To: In other instances, areas will be circled “in digital image files” for natural image (picture point) location by the field crew.

• Page 5-5 – Revised the following language in the second paragraph under “Section 5.05 Annotation of Control Points” from: “If pre-marked targets are used, the points will be numbered sequentially, beginning with (UPC#)_101 and increasing one at a time, until all control points are numbered [(UPC#)_101, (UPC#)_102, (UPC#)_103, etc.]” To: “If pre-marked targets are used, the points will be numbered sequentially, beginning with 101 and increasing one at a time, until all control points are numbered (101, 102, 103, etc.)”

Revised the following language in the third paragraph under “Section 5.05 Annotation of Control Points” from: “When natural images or picture points are used, the points will be numbered sequentially, beginning with (UPC#)_501 and increasing one at a time, until all control points are numbered [(UPC#)_501, (UPC#)_502, (UPC#)_503, etc.]” To: “When natural images or picture points are used, the points will be numbered sequentially, beginning with 501 and increasing one at a time, until all control points are numbered (501, 502, 503, etc.)”

Added the following language in the fourth paragraph under “Section 5.05 Annotation of Control Points” from: “The number assigned to a control point must be written beside that point's location on the photograph. Also, if the point lies on a centerline or a traverse line, the corresponding station should be written beside the control point on the photograph. All coordinate values of points should be annotated using the following format: ID – X – Y – Z. Control point ID numbers, coordinate values and descriptions (where applicable), should be clearly written on the backs of the contact prints using permanent ink.” To: The number assigned to a control point must be written beside that point's location on the photograph “or in an electronic image file.” Also, if the point lies on a
centerline or a traverse line, the corresponding station should be written beside the control point on the photograph”/image file.” All coordinate values of points should be annotated using the following format: ID – X – Y – Z. Control point ID numbers, coordinate values and descriptions (where applicable), should be clearly written on the backs of the contact prints using permanent ink “or place in image files.”

Revised the following language in the third sentence in the fifth paragraph under “Section 5.05 Annotation of Control Points” from; “Also, it is unnecessary to annotate control points on every photograph.”  To: Also, it is unnecessary to annotate control points on every “film” photograph.

Revised the following language in the fifth sentence in the fifth paragraph under “Section 5.05 Annotation of Control Points” from; “When marking control points on the photographs, use the following symbology:”  To; When marking control points on the photographs “or in an electronic image file”, use the following symbology:

- Page 5-6 – Added the following language at the beginning of the first paragraph under “Section 5.06 Delivery of Control Point Information”; “All data to be delivered via the ProjectWise file management system.”

Revised the following language in the second sentence in the first paragraph under “Section 5.06 Delivery of Control Point Information”; “Once all control point values have been read and checked, and all contact prints annotated…”  To; Once all control point values have been read and checked, and all contact prints “/images” annotated…

Revised “Example of ASCII Files Format” table to remove “UPC number” identifier under “ID”.

Revised the following language in the first sentence of the last paragraph under “Section 5.06 Delivery of Control Point Information”; “For projects having the Photogrammetry performed by consultant forces, send the control information…”  To; For projects having the Photogrammetry performed by consultant forces, “upload into ProjectWise and” send the “link to the” control information…

- Page 5-9 – Revised the language in item A under “Pre-marked “X” or “Cross” Targets” to remove the “UPC number” identifier.

Revised the language in item A under “Picture Points” to remove the “UPC number” identifier.

- Page 5-27 – Revised the following language under “Deliverable” from; “Processed Aerial Film or Digital Camera Imagery, Flight Map, Current Aerial”  To; “Processed Digital Camera Imagery, Flight Map, Current Aerial Camera Calibration Report”
Revised the following language under “Notes:” from: “Photogrammetry consultants are expected to send the processed, un-annotated, and uncut negatives to VDOT for inspection and annotation. Any contact prints and scanned imagery necessary for completing the Photogrammetry work will be sent to the Photogrammetry consultant upon request, by the VDOT Photogrammetry Unit.

When project circumstances and schedules do not allow sufficient time for the consultant to send the film to VDOT prior to Photogrammetry project startup, the consultant will be permitted to produce all photographic products necessary (contact prints, diapositives, scans, etc.), to complete the required phase(s) of work before sending the film to VDOT. Prior approval will be required from the State Photogrammetry Engineer before any contact print; dispositive, scan, etc. are generated under this exception. In this instance, the consulting firm will still be required to send the processed film to VDOT within 30 days of completing the photo mission. To: Photogrammetry consultants “will” send the processed, “aerial imager” to VDOT for inspection and “acceptance by uploading to ProjectWise. Consultant will email a link to the ProjectWise location to the State Photogrammetry Manager.”

Revised the following language under “Deliverable:” from: “Aerotriangulation Report- Include all Contact Prints with annotated control points (good-quality copies are acceptable). Contact Prints or digital target location map file should have the mapping limits annotated.” To: Aerotriangulation Report- Include all digital target location maps “and ISAT formatted triangulation/stereo model files.”

- Page 5-28 – Revised the following language under “Notes:” from: “Photogrammetry consultants will be expected to submit the aerotriangulation report and electronic data files by VDOT FTP server, regular mail, fax, or email. Contact prints or digital imagery are to be sent by regular mail.” To: Photogrammetry consultants “are” expected to submit the aerotriangulation report and electronic data files by “ProjectWise. An email shall be sent with the link to the ProjectWise folder.”

- Page 5-29 – Revised the following language to item “C” in the “Post-Aerial Flight Deliverables Check List” from: “Un-annotated, processed, aerial negative film or digital sensor imagery files delivered.” To: “Digital sensor imagery files.”

- Page 5-30 – Revised the following language in the first sentence in the first paragraph under “Notes” from: “Photogrammetry consultants will be expected to submit the completed orthophotos on CD or placed on VDOT FTP server.” To: Photogrammetry consultants will be expected to submit the completed orthophotos on “ProjectWise”.

- Page 5-31 – Revised the following language in the second and third paragraph from; “State Survey Program Manager” To: “Geospatial” Program Manager
• Page 5-32 – Revised the following language in the first paragraph from: “The following table lists the deliverable, file format, and maximum file size for projects utilizing LIDAR. All VDOT projects utilizing LIDAR will be restricted to the following digital file formats and maximum sizes.” To; The following table lists the deliverable “and” file format, for projects utilizing LIDAR. All VDOT projects utilizing LIDAR will be restricted to the following digital file formats.

Revised language in the “Chart” to delete the “Maximum File Size” column.

Deleted the following language; “Note: When cutting data to meet file size specifications, it is important to use the same-sized “shape” throughout the project to create each block of cut data (i.e. rectangle, square, etc.)”

Chapter 6

• Page 6-1 – Revised the following language in the first sentence in the last paragraph from; “… to the Central Office (State Survey Program Manager)…” To; “… to the Central Office (“Geospatial” Program Manager)…”

Chapter 7

This chapter was completely rewritten (No shading shown).

Chapter 8

• Page 8-1 – Added the following language at the end of the second paragraph under “Section 8.01 General”; “All points staked must be recorded with a 10k additive to the staked point number and downloaded to a staked .dgn file which is stored in ProjectWise.”

Chapter 12

• Page 12-2 – Revised the following language in the second sentence under “Section 12.02.2 Materials Necessary to Provide Services” from; “… or State Survey Program Manager…” To; … or “Geospatial” Program Manager…

Chapter 13

This chapter was completely rewritten (No shading shown).

Appendix A

This chapter was completely rewritten (No shading shown).