

2l. VDOT requires that the final adjusted coordinates for the *GNSS project shall be the product of a three-dimensional least squares adjustment software package.

2m. Static observation procedures shall be required for all baselines with a length of 20 kilometers (km) or longer. For a baseline length between 20 and 50 kilometers, observation sessions shall be at a minimum, 2.5 hours plus one minute per kilometer of baseline length for that session. For a baseline length between 50 and 100 kilometers, observation sessions shall be at a minimum, 3.5 hours plus one minute per kilometer of baseline length for that session. Proper mission planning and point site selections are vital to the success of the observing session.

2n. Rapid Static observation procedures may be used for all baselines shorter than 20 kilometers (km) in length. Observation sessions shall be at a minimum, 15 minutes plus one minute per kilometer of baseline length for that session. Proper mission planning and point site selections are vital to the success of the observing session. From a conservative standpoint, it is strongly recommended to add additional time to minimize the effect of solar activity, atmospheric refraction and unhealthy satellites.

2o. The determination of observation duration is the responsibility of the Surveyor of responsible charge, and will be a function of the spacing of known control, distance of known control to survey project control, and the length of the project corridor among other factors. Again, if control is farther than 20 kilometers from the project, static observation procedures will be used.

3. **Securing Photogrammetry Control.** Securing control for photogrammetry will also follow the same guidelines as listed above. If control is nearby, the photogrammetry mission can be accomplished with rapid static observation procedures using “leap-frog” or traversing techniques through the control such that direct measurements are made between consecutive targets. Intermittent ties to the existing, known control and/or the monumented project control should be made during the mission. Proper mission planning techniques will develop the best results and checks for the mission. **The adjustment of photogrammetry control should be independent of the VDOT Project Control Monumentation adjustment.**

4. **Utilizing RTK GNSS on VDOT Projects.** At the time of this revision to the Survey manual, VDOT is currently allowing the use of Real-Time Kinematic (RTK) GNSS surveying equipment and procedures capable of achieving a 2-cm positional accuracy. RTK GNSS surveying techniques utilizing a base station on established control such as a VDOT project control point, a HARN point, or dialing into a subscription RTK service for corrections for securing photo control and topography will be acceptable to VDOT when measures are taken to insure similar accuracy results as would be achieved by using Static or Rapid-Static procedures outlined in this manual*. Prior to securing photo control, the surveyor shall have a base unit set on known control and shall check the values at another control point with the roving

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