

JUNEAU USGS LIDAR MAPPING SUPPORT

**JUNEAU, ALASKA
SURVEYING AND MAPPING REPORT**

Prepared for:

NV5
2014 Merrill Field Drive
Anchorage, Alaska 99501

Prepared by:

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DOWL Project Number: 1127.63390.01

Field Project dates: August 30th through September 4th, 2021

REPORT DATA SEPTEMBER 13TH, 2021

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LIST OF ACRONYMS

CA.....	Calibration Point
CORS	Continuously Operating Reference Station
GNSS	Global Navigation Satellite System
NGS.....	National Geodetic Survey
NTP.....	Notice to Proceed
NVA.....	Non-vegetated Vertical Accuracy
OPUS	Online Positioning User Service
QC.....	Quality Control
RTK.....	Real Time Kinematic
TBC.....	Trimble Business Center
USGS	United States Geological Survey
VVA.....	Vegetated Vertical Accuracy

HORIZONTAL & VERTICAL CONTROL SUMMARY

1.0 INTRODUCTION

This project consists of locating 9 Non-vegetated Vertical Accuracy (NVA), 8 Vegetated Vertical Accuracy (VVA) locations, 14 Urban locations and 15 CA to support NV5 in a lidar aerial mapping effort. DOWL was contracted by NV5 as the independent subconsultant to perform these services. Incidental to these services was also the recovery and establishing of survey control to perform the above described services. NV5 provided DOWL geographic positions of the requested NVA, VVA and CA points, and efforts were made to collect data in those areas. Limited changes were made to their plan and only in instances of on-going construction, adverse ground conditions or clearing that had changed the vegetated classification.

2.0 CONTROL SUMMARY

A field survey was performed by DOWL on between August 30th and September 4th, 2021, under the direct supervision of A. William Stoll, PLS #12041. Before mobilizing to the field, Willie performed a robust search of the National Geodetic Survey (NGS) record to determine existing monuments to utilize as project control. Also, a thorough review of the Continuously Operating Reference Stations (CORS) was reviewed to determine which would be beneficial to have in the record and utilize for the control network. It was decided new control would be established to provide the most advantageous RTK and satellite acquisition locations. The geometry of the two locations was selected to provide strong network ties to the proposed locations.

Two static primary control stations were established. One near the Juneau International Airport and one on Douglas Island. Global Navigation Satellite System (GNSS) data was collected on these points and sent to the NGS Online Positioning User Service (OPUS). A GNSS network was processed using Trimble Business Center (TBC) minimally constrained to an OPUS solution and incorporating a nearby Continuously Operating Reference Station (CORS) station as a check. The unadjusted OPUS solutions were verified and held.

The project required that the checkpoints vertical accuracy be greater than 1.67cm (0.055 feet). To achieve this high level of accuracy using Real Time Kinematic (RTK) GNSS, the checkpoints were observed from the two RTK bases, at different times of the day. This optimized the satellite constellation geometry and utilized the strength of the GNSS network. The four independent positions were non-weighted averaged in excel for ease of data verification. The averaged positions varied from individual measurements with a standard deviation of 0.02' Northing, 0.02' Easting and 0.05' Vertically. The allowable Root Mean Square Error (RMSE) in the vertical component was met with the observed RMSEz=0.048 feet, which is less than the allowable error of 0.055 feet.

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3.0 HORIZONTAL CONTROL STATEMENT

COORDINATE SYSTEM:

Coordinates are Alaska State Plane Zone 1 expressed in U.S. Survey Feet. Coordinates are based on an OPUS solution at Control Points 1 and 2.

4.0 VERTICAL CONTROL STATEMENT

Elevations are NAVD88 as determined by Geoid 12B expressed in U.S. Survey Feet. Elevations are based on an OPUS solution at solution at Control Points 1 and 2.

5.0 QUALITY ASSURANCE

Quality Assurance (QA) methods and procedures outlined in the statement of services were reviewed with our staff and adhered to. Some examples of QA methods include the following:

- All equipment utilized during this project was checked for accuracy, and adjusted when necessary, prior to commencing any work.
- Redundant distance measurements were made in feet and meters.
- Tripods with optical plummet tribrachs or laser plummet tribrachs were used to set up over the points while measuring all control.
- Multiple independent solutions were observed at the NVA, VVA and CA locations.

6.0 SURVEYOR'S CERTIFICATION

I, A. William Stoll, Alaska Land Surveyor #12041, do hereby certify that the information contained herein is the result of work performed by me or by others working under my direct supervision.

A. William Stoll, PLS
Alaska Professional Land Surveyor No. 12041

SEPT 13, 2021
Date

