



## **GLENN HIGHWAY MP 66-92, KINGS RIVER SECTION SURVEY and MAPPING REPORT**

Prepared by:

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### **PROJECT INFORMATION AND REFERENCES:**

#### **2015 R&M Survey**

Kings River field surveys were performed by R&M Consultants, Inc. between October 17th and December 14<sup>th</sup>, 2015.

Project datum is DOT Central Region MV-1.

Horizontal and Vertical Control values were provided by Western Federal Lands (WFL) Highway Division, a division of the U.S. Department of Transportation Federal Highway Administration. Reference WFL Survey Control drawing: *AK DOT 135(2), Glenn Highway MP 66.5-MP 92*.

Control Stations 13102-13112 were recovered in good condition. A GPS static survey was performed on all eleven stations as a check on WFL record positions. The network was least-squares adjusted and found to be accurate. Record horizontal control values were accepted.

Vertical control values were checked with differential levels using a Leica DNA-10 digital level. A closed loop was performed, beginning at 13102 and ending at 13112. Stations 13102-13108 compared well and were accepted for vertical control. The levels through stations 13108-13112 produced elevations that separated from record up to 0.07'. Control station 13108 was held in a closed loop through 13109-13112. Elevations for stations 13109-13112 were revised for this project. Revised elevations are reported within this drawing.

### **CONTROL BASES AS STATED ON WFL'S SURVEY CONTROL DRAWING:**

#### **Basis of Coordinates:**

The Basis of Coordinates is NGS Station PURIN, located near Milepost 91 of Glenn Highway. Said station has MV-1 coordinates of 231,730.0664 N, 232,079.1864 E.

#### **Basis of Bearings:**

The Basis of Bearings is a local plane bearing between NGS Station PURIN and NGS Station PAQB. NGS Station PAQB bears S 64°53'54" W a distance of 189,974.66 U.S. Survey Feet from NGS Station PURIN. NGS Station PAQB has MV-1 coordinates of 151,137.6479 N, 60,046.5335 E.

#### **Basis of Vertical Control:**

The Basis of Vertical Control is NAVD88 as determined by a series of level loops performed by DOT.

**LAND STATUS AND BOUNDARY INFORMATION:**

DOT provided R&M with two ROW drawings. Kings River falls at the interface of these two ROW projects. The north project is recorded as plat 2015-16, PRD, and is in the same coordinate system as this project's: MV-1. The south project is recorded as plat 2012-29 and is in a different datum and in meters. I had intended to extract ROW information from each project and place them into the Kings River basemap. This is beyond the project scope, but I deemed it a value if the task wasn't too much effort. The drawings were complicated and linework was broken into a myriad of layers that were difficult to decipher. After too much time and effort, I decided to bring only the ROW hatching into the project basemap. I found a common section line and scaled the south section meters ROW hatching and translated it to the north project, then inserted the two hatches from there into this project's basemap. These ROW hatches are the only land status to reside in the project basemap.

**PROJECT DTM:**

Surface *Kings River* resides within the project basemap. The surface has been "promoted" so that it stands alone. Breaklines and points have been disassociated. 65 edits were added late in the project. These remain in the surface definition. A new promote could be executed but contour labeling would need repeated.

3d faces have been saved off as an alternate method of transferring the drawing into other formats. The 3d faces are included in the submittal both as an AutoCad drawing and a DXF. Note, older versions of AutoCad required that a Lisp be used to convert 3d faces to 3d lines before creating a surface or TIN. The entire surface would be created from 3d breaklines. This method created a perfect match, except that border lines would be created. Extracting a TIN border and applying it is an alternative to removing the unwanted border lines by hand.

**PROJECT TIN CERTIFICATE:**

207 check shots were surveyed across the project after the topographic survey was complete. This was 157 more than I asked for. I arbitrarily removed shots until 68 evenly spaced points remained. These 68 shots were used in developing the project TIN certificate. The entire 207 shots are included in the "I" submittal folder if there is curiosity with regards to the entire data set. Note: I would have preferred that more check shots had been taken higher into the steep portions of the project. However, I do not believe these areas are slated for design, and thus felt it unnecessary to send the crew back to survey additional checks there.

**HYDROLOGY X-SECTIONS:**

The project basemap and TIN do not include the creek x-sections asked for in the project scope. We originally had them included, but I removed them. They created tremendous clutter. The reason for this is that the basemap was surveyed without thought of the x-sections. Two foot contours cannot be obtained with 50' x-sections in terrain such as this. It is simpler to survey the



creek with standard procedures, and then survey the x-sections separately. For this reason, the x-sections have their own drawing. This isn't always the case, but we believe it was best applied here. A separate point file is placed in the "B" submittal folder.

A drawback of performing the hydrology separately is that it doesn't always agree perfectly with the basemap. The surveyor sees the survey a little differently a second time.

A benefit of performing the hydrology separately is that a basemap backs up the hydrology survey and can be used to comprehend the x-sections with more clarity.

A TIN was developed within the Hydrology drawing. This surface is unsatisfying to look at, but may help understand the x-section point information. The points themselves are the product and fulfill the scoped request.

The Party Chief surveyed 25 x-sections. This is 10 more than are depicted on the scope Exhibit C. We leave it to the hydrologist to thin the data as needed.

### **BRIDGE SURVEY:**

We were not scoped with a "bridge site survey". However, the bridge was indeed within our survey limits. Our understanding of forthcoming design plans is incomplete. Therefore we detailed the bridge to a significant degree without overdoing it (hopefully). As is always the case with bridge surveys, it is difficult to portray the abutments and piers in a two dimensional drawing. It is just as difficult to draft abutments and piers in two dimensions. We have found it easier to draft these features in 3 dimensions. It is also easier to view these features in 3 dimensions, but it can get a little disorienting with the entire project drawing and can tax the computing ability of your work station. We have extracted the bridge abutments and piers into a separate drawing that can easily be viewed in 3 dimensions. The ground is not featured in this drawing. Abutment lines that end abruptly are shown to where they intersect the ground.

All 3d bridge linework and points reside in the project basemap as well as the separate bridge drawing.

### **UTILITY LOCATES:**

A utility locate request was submitted to Dig Line Alaska. Matanuska Electric and Matanuska Telephone both responded to the request and both declared "no conflict". No known underground utilities exist on the project.

### **SITE PHOTOS AND INDEX:**

Site photos area provided in submittal folder "H". A photo sketch index can be found on page 60 of the field book.

**RHB**