
KIVALINA EVACUATION AND SCHOOL SITE ACCESS ROAD PROJECT 0002384/NFHWHY00162 SUMMARY OF BOUNDARY PROBLEMS REPORT JULY 13, 2018

Introduction

The purpose of this assignment is to develop right-of-way (ROW) acquisition plans, plats and legal descriptions for the Kivalina Evacuation and School Site Access Road project. The assignment is authorized under NTP P1-1 & 2 of PSA 25-18-1-029 for the Term Agreement for Rural Surveying, Mapping, and Right of Way Services 2018.

The project consists of 13 parcels along a 300-foot wide proposed ROW, 150-feet on each side of centerline through mostly undeveloped rural lands. Parcel E-1, located within the Kivalina Airport boundary, will be transferred to the City of Kivalina as an easement. Parcels 2 and 3 within the DNR managed Kivalina Lagoon tidelands will be transferred to DOT&PF under an Interagency Land Management Assignment or Tidelands Permit. Parcels 4 through 13 are east of the Kivalina Lagoon and are currently owned by NANA Regional Corporation. While the acquisition from NANA is continuous along the alignment, the parcels were created to account for each section that the alignment passes through. The NANA parcels will be fee acquisitions to be conveyed to the City of Kivalina as a part of NANA's ANCSA 14(c)(3) reconveyance obligation.

Project Location

The project is located in Kivalina, 77 miles northwesterly of Kotzebue. The approximately 7.7 mile alignment commences at U.S. Survey No. 3776, Kivalina Airport and then proceeds northeasterly through Sections 21, 16, 15, 10, 11, 2 and 1 of Township 27 North, Range 26 West, Kateel River Meridian. The alignment then proceeds northeasterly through Section 36 of T.28N, R.26W., and then continues through Sections 31, 30, 19 and 20 of T.28N., R.25W.

Control – Design - ROW Surveys

The control survey and monument ties used to develop the project ROW plans are primarily based on the DOT&PF Survey Control Diagram (SCD) record of survey signed and sealed by Michael E. Miller, RLS and filed as plat no. 2018-1 on June 18, 2018 in the Kotzebue recording district. The survey control drawing was based on a field survey performed by McClintock Land Associates, Inc. (MLA) from September 14 through September 21, 2016. Design survey contours, topography and edge of water outlines were created using LiDAR and aerial photography provided by Quantum Spatial.

ROW & Boundary Issues/Notes

Control/ROW Survey Limitations

The Survey Control Diagram Record of Survey Plat 2018-1 contained the following note:

“Roads and property lines are shown for background and orientation only. A true boundary survey was not a part of this survey and no determination has been made to ensure the boundaries are depicted in the proper location. PLSS monuments shown are in their true location related to the project coordinate system. There was no attempt to rectify the background information such that monuments appear to fall in the proper relationship to section and subdivision of section lines.”

The Statement of Services (SOS) provided by DOT&PF for this assignment recognized that the U.S. Survey and Section line boundaries shown on the Survey Control Diagram (Plat 2018-1 KRD) were not reliable and would have to be redeveloped by R&M using the SCD only for recovered monument coordinates. To the extent possible, R&M would obtain other data necessary to establish reasonable property boundaries within the project limits. The SOS required R&M to “describe the property development process for section line and U.S. Survey lines” in this report.

Boundary Computations

The computations required for this project can be classified into four categories; section line computations, U.S. Survey boundary computations, Mean High Water (MHW) line computations, and the computation of the Kivalina Airport boundary.

- U.S. Survey Boundary Computations

The computations involved in establishing the boundaries of the various U.S. Surveys was fairly straight forward. For those U.S. Surveys where corner positions were provided to R&M, boundaries were established from monument to monument. The record meander lines of the U.S. Surveys were determined by the Grant Boundary Adjustment method between the record bearings and distances of the Witness Corner Meander Corners (WCMC) on each side of meander line.

For those U.S. Surveys shown where no corners positions were provided to R&M, boundaries were established at record bearing and distance from the necessary monuments as shown on the official U.S. Survey plats.

The official U.S. Survey plats are annotated with the project point numbers and are provided with the project deliverables.

- Section Line Computations

As mentioned in the Project Location section of this report, the proposed right-of-way corridor travels through Township 27 North, Range 26 West and Township 28 North, Range 26 West and Township 28 North, Range 25 West, all in the Kateel River Meridian (K.R.M). All of said townships were surveyed according the BLM Manual of Survey Instruction (1973). Section

corners were computed by R&M using the applicable methods in the BLM Manual of Surveying Instruction (1973). There were scenarios where a modification from the BLM Manual had to be employed due to the lack of corner positions provided. Section corner computations are described in each township below. All computations were performed geodetically using the geodetic coordinates provided by MLA. The computed geodetic positions were converted to Alaska State Plane Zone 8 Grid coordinates, in U.S. Survey Feet, using the National Geodetic Survey (NGS) NCAT version 1.1 program, then transformed to the local coordinates per the SCD filed as Plat No. 2018-1 in the Kotzebue Recording District. Point numbers mentioned in the discussions below can be referenced in said SCD and the Computation Diagram provided at the end of this report.

▪ **Township 27 North, Range 26 West, K.R.M.:**

The first official township plat was approved on December 28, 1978. The Supplemental Plat of Section 9 was approved on April 15, 2005. The official Photogrammetric Resurvey and Segregation Survey was approved on September 15, 2006. This township is fractional by the Kivalina Lagoon and the Chukchi Sea. Only the north and east township boundaries are surveyed, all interior section lines are protracted, and no interior section corners were monumented during the official survey. The steps to compute the necessary section corners in this township are outlined below in order of operation.

1. *Compute section corners on the north township boundary.* Points 2014 thru 2018 were computed by single proportion on the latitudinal arc between points 767 and 785, as referenced in Sections 5-30 thru 5-34 of the BLM Manual.
2. *Compute section corners on the east township boundary.* Point 2012 was computed by single proportion between points 767 and 784, according to Section 5-31 of the BLM Manual. Point 2013 was computed by single proportion between points 784 and 60, according to Section 5-31 of the BLM Manual. Point 60 is the section corner common to sections 24 and 25. The position of point 60 was not provided by MLA, but was established by R&M using data acquired during the official Dependent Resurvey, Retracement and Survey of Township 27 North, Range 25 West, K.R.M approved in April 16, 2011. Jim Robar, PLS and employee of R&M performed said survey under contract to BLM in 2008. The raw GPS data provided by Jim was used in a least-squares network adjustment, fixed to common points between Jim's survey and MLA's survey. We don't know if MLA searched for point 60, but we needed the position to compute point 2013. The official BLM survey established Meander Corners (MC) along the east township boundary, however no positions were provided and therefore R&M did not compute said meander corners.

3. *Compute interior section corners.* The interior section corners were computed by a geodetic bearing-bearing intersection between the north-south section lines and the east-west section line, according to Sections 3-97 thru 3-99 of the BLM Manual. The north-south interior section lines were established at record bearings, as computed from the official protraction diagram positions, originating from the computed section corners on the north township boundary. The east-west section lines were established parallel to the measured true mean bearing of the north township boundary, originating from the computed and found section corners along the east township boundary.

- **Township 28 North, Range 26 West, K.R.M:**

The first official township plat was approved on December 28, 1978 and was surveyed concurrently with Township 27 North, Range 26 West, K.R.M. The official Photogrammetric Resurvey and Segregation Survey was approved on October 6, 2006. A portion of this township is fractional by the Kivalina Lagoon. Portions of the township exterior are surveyed, however all interior section lines are protracted, and no interior section corners were monumented during the official survey. The steps to compute the necessary section corners in this township are outlined below in order of operation.

1. *Compute section corners on the south township boundary.* This was done in step 1 of Township 27 North, Range 26 West, K.R.M.
2. *Compute section corners on the east township boundary.* Point 2780 is the computed section corner of sections 19 and 30 within Township 28 North, Range 25 West, and is based on the record bearing and distance from the off line Witness Corner (WC) point 780. Point 2007 was computed by single proportion between points 767 and 2780, according to Section 5-31 of the BLM Manual. Point 2001 was computed by single proportion between points 2780 and 783, according to Section 5-31 of the BLM Manual.
3. *Compute interior section corners.* The proposed right-of-way corridor only passes through section 36 of this township, therefore only the corner common to sections 25, 26, 35, and 36 was computed for the interior section corners within this township. Point 2028 was computed by a geodetic bearing-bearing intersection between the north-south section from point 2014 and the east-west section line from 2007. The bearings were computed from the official protraction diagram positions. This method may differ from the BLM Manual for this section corner. Bearing-bearing intersection was used due to the lack of corner positions on the north township boundary.

- **Township 28 North, Range 25 West, K.R.M:**



The first official township plat was approved on December 28, 1978 and was surveyed concurrently with Townships 27 North and 28 North, Range 26 West, K.R.M. The official Photogrammetric Resurvey and Segregation Survey was approved on October 6, 2006. The official Dependent Resurvey, Retracement and Survey was approved on April 15, 2011. The steps to compute the necessary section corners in this township are outlined below in order of operation.

1. *Compute section corners on the west township boundary.* The section corners on the west township boundary were established as described earlier in Township 28 North, Range 26 West, K.R.M.
2. *Compute section corners on the south township boundary.* No corner positions were provided by MLA on the south township boundary. R&M had to use data acquired by Jim Robar, PLS and employee of R&M, during the performance of the Dependent Resurvey, Retracement and Survey under contract to BLM in 2008. The raw GPS data provided by Jim was used in a least-squares network adjustment, fixed to common points between Jim's survey and MLA's survey. We don't know if MLA searched for points 63 and 64. Point 63 is the section corner common to sections 31 and 32. Point 64 is the witness corner to the section corner common to sections 32 and 33. Point 2008 is the computed section corner of sections 32 and 33, established at record bearing and distance from point 64, according to Section 5-17 of the BLM Manual.
3. *Compute interior section corner common to section 7, 8, 17, and 18.* According to the BLM Manual, in most cases for regular townships, lost or protracted interior section corners are to be established by double proportion from the nearest existing corners to the north, east, west, and south. Due to the lack of corner positions provided to R&M on the east and north township boundaries, the BLM manual could not be strictly adhered to in this case. Instead, point 2003 was established by three-point control between points 782, 783, and 63. Three-point control is a modified version of the double proportion method and is described in Section 5-29 of the BLM Manual. The record dimension used for this computation are from the Calculation Diagram within the official field notes of the Dependent Resurvey, Retracement and Resurvey approved on April 15, 2011 and is provided at the end of this report.
4. *Compute the interior section corners common to sections 17, 18, 19, and 20, and also the section corner common to sections 29, 30, 31, and 32.* Points 2004 thru 2006 were computed by single proportion between points 63 and 2003, according to Section 5-31 of the BLM Manual, using record data from the Calculation Diagram



within the official field notes of the Dependent Resurvey, Retracement and Resurvey approved on April 15, 2011. These positions should be computed by double proportion according to the BLM Manual.

5. *Compute the section corner common to sections 28, 29, 32, and 33.* Point 2009 was computed by three-point control between points 781, 2008, and 2006, according to Section 5-29 in the BLM Manual.

- Mean High Water Line (MHW) Computations

The approximate MHW lines of Parcels 2, 3, and 4 were determined from a field survey performed by R&M on July 4, 2014 and are based on National Tidal datum 9491253, Kivalina AK, Epoch 1983-2001. MHW elevations were determined by differential levels originating from NOAA tidal bench mark 949 1253 E. The published MHW elevation of bench mark 949 1253 E = 11.85 feet. To convert Navd88 project elevations to Mean Lower Low Water (MLLW) datum elevations, subtract 2.77 feet. To convert Navdd88 project elevations to MHW datum elevations, subtract 3.54 feet.

- Kivalina Airport Boundary Computations

The Kivalina Airport boundary forms the boundary between Parcels 2 and 3. That portion of the airport boundary which affects Parcels 2 and 3 is based on offsets from the runway centerline and the boundary of Lot 1, U.S. Survey 3776. No runway centerline positions were provided to R&M. The runway centerline was re-established based on the Project Layout Plan, sheet 2 of 16, as-built construction plans for Kivalina Airport Relocation, project no. D21332, 1985. The WCMC of Lot 2, U.S. Survey 3776 (designated as Mon. "B" on said plans) was tied during the aeronautical survey of the Kivalina Airport, performed by USKH, Inc., and was provided by DOT&PF. The record offset from Mon. "B" was held to re-establish the taxiway and thereby re-establishing the runway centerline from record bearing and distance from said plans. The runway centerline re-established for the airport boundary could differ from the current runway alignment.

Begin Project Station & Kivalina Townsite

The beginning of project (BOP) commences at station "South" 10+00.00 on the southeasterly boundary of Lot 1, U.S. Survey (USS) No. 3776 that was conveyed to the State of Alaska for the Kivalina Airport in patent No. 1231546 on February 11, 1963 and recorded in Book 26, Page 376 on April 24, 1963 in the Noatak-Kobuk Recording District. The southerly boundary of USS No. 3776 adjoins the northwesterly boundary of USS No. 5582, the Kivalina Townsite. The BOP aligns approximately with the northwesterly extension of Bering Street.

General Title/Land Status Issues

RS-2477: **[There are no RS-2477 conflicts in the project area.]** The on-line DNR RS2477 Trails Search Utility was used to determine whether the State of Alaska asserts any RS-2477 rights-of-way in the project vicinity. A search of the Noatak Quadrangle returned only RST 122, the Kotzebue –Noatak Trail as a qualified RS-2477 ROW. The northerly end of this trail is approximately 43 miles to the southeast. No qualified RS-2477 trails were found to exist within the project area.

RS-2477 is also the basis for federal section line easements (SLE). The offer for RS-2477 was repealed on October 21, 1976 by Section 706 of the Federal Land Policy and Management Act of 1976 (FLPMA). The initial Kivalina Township surveys were approved by BLM in December of 1978 therefore eliminating the possibility of an easement based on surveyed section lines. DNR has in the past taken the position that federal section line easement might exist based on protracted or unsurveyed section lines as of the date that the protraction diagram was filed in the Federal Register. However, based on past practice and the probably legal challenge that would accompany an assertion of a protracted SLE, our opinion is that they should not be considered as viable at this time and for this project.

ANCSA 17(b) Easements: **[There are no ANCSA 17(b) Easement conflicts in the project area.]** The on-line BLM 17(b) maps at <http://sdms.ak.blm.gov/sdms/> return a single 17(b) in close proximity to the project. The USGS Noatak C-5 quad map dated 2/20/08 indicates a 17(b) easement running northwesterly along the barrier islands through the Kivalina Townsite and the Kivalina Airport. The Department of Commerce, Community, and Economic Development (DCCED), Division of Community and Regional Affairs (DCRA) Kivalina Community Map indicates that the trail is located to the west of the Kivalina Townsite and Airport along the beach. Easement EIN 1 C3, C5, D1, D9 is listed in Patent 50-2015-0071 to NANA Regional Corporation, Inc. as a 25-foot wide for a winter only existing access trail. There appears to be no conflict with Evacuation Road project.

The NANA patent also makes reference to a NANA Interim Conveyance 1759 that intended to grant two easements across the Cape Krusenstern National Monument to the east and southeast of Kivalina. These easements are shown on the Noatak C-5 17(b) map as Trail A and Trail B. As both trails are south of the Wulik River, they have no impact on the Evacuation Road project.

Maritime NWR Conflicts: **[There are no National Wildlife Refuge conflicts in the project area.]** The 2013 DCRA Kivalina Community Map shows a boundary encompassing the barrier island that contains the Kivalina Townsite and Airport. Another boundary line is shown along the easterly tidal boundary of Kivalina Lagoon. The line is labeled “AK Maritime NWR Boundary”. These boundaries replicate the boundaries shown on the BLM Master Title Plat for sections 16, 17 & 21 of T.27N., R.26W., K.R.M. and reflecting the Public Land Order (PLO) No. 5184 withdrawal and classification of lands. The on-line U.S. Fish & Wildlife Service National Wildlife Refuge GIS indicates that near Kivalina, only two islands at the mouth of the Wulik River are subject to the Alaska Maritime NWR. To resolve the apparent NWR conflict with the project, Diane Biesanz, Chief Realty Operations Branch and John Brewer, Chief, Mapping Science with USFWS were contacted. PLO 5184 was a post-ANCSA and pre-ANILCA (Alaska National Interest Lands Conservation Act) Order to withdraw federal lands for consideration of inclusion

within an ANILCA Conservation System Unit (CSU). The withdrawal boundaries as depicted on the BLM MTP and the DCRA Community map set aside the Kivalina Lagoon for consideration. The on-line USFWS GIS reflects the results of that consideration and wildlife refuge boundaries as determined by ANILCA.

Navigable Waters: **[There are no navigable waters conflicts in the project area.]** According to A.S. 38.04.062 Identification of state submerged land, "...the state owns all submerged land underlying navigable water to which title passed to the state at the time the state achieved statehood under the equal footing doctrine or 43 U.S.C. 1301 — 1315 (Submerged Lands Act of 1953)."

Navigable Rivers: The on-line DNR Alaska Mapper Navigable Water layer indicates that there are two navigable bodies of water in the project vicinity. These include the Wulik River from its mouth directly east of Kivalina Townsite to the northeast and Qayaqtaugiaq Slough to the northwest of the project alignment. According to Wendy Steinberger in the DNR Navigability Section, The Qayaqtaugiaq Slough was identified as navigable primarily due to its tidal influence. The Navigable Waters web map contains the following disclaimer: "This map does not identify all navigable waters due to scales and/or data limitations. Further, water not included is not considered either navigable or non-navigable until the commissioner has made a determination as to his navigability at the time the state achieved statehood." These two navigable waters will have no effect on the proposed project ROW.

Other Navigable Bodies of Water: The project LiDAR survey indicates that the proposed ROW may cross or be in close proximity to several small lakes or ponds. Some of these bodies of water were lotted as a part of the initial rectangular surveys approved in 1978. These township surveys include the note: "Water lot designations are to facilitate identification and computations only and are not intended to fix boundaries or alter riparian entitlements." Further Photogrammetric Resurvey and Segregation Surveys were performed and approved in 2006. These plats amended lotting and segregated areas of water in part to ensure that they would not be chargeable against the ANCSA selections. These plats contain the note: "Acceptance of this survey does not purport to transfer any interest in submerged lands to which the State of Alaska is entitled under the Equal Footing Doctrine and Section 6 of the Alaska Statehood Act, P.L. 85-508, notwithstanding the use, location, or absence of meander lines to depict water bodies." Discussion with the DNR Navigability staff indicates that the State of Alaska would not assert that these small lakes and ponds were navigable and held under state title.

Proposed ROW Parcels & Title Review

While this project has certain complexities, resolution of conflicts with existing rights-of-way is not one of them. The proposed road is new and the other than passing through the State owned Kivalina Airport property, all of the proposed ROW will be newly acquired.

Parcel E-1: The project begins at the north end of the Kivalina Townsite and south end of Kivalina Airport. The uplands portion of the proposed ROW within the airport boundary will be transferred to the City of Kivalina by easement deed. As the Kivalina Airport patent was issued to the State under Section 16 of the Federal Airport Act of 1946. The patent and legislative authority requires that the lands conveyed by the patent be used only for airport purposes. This transaction will require approval

by the Federal Aviation Agency (FAA) for non-aeronautical use. The Kivalina Airport Land Occupancy (LO) drawing dated 3/10/15 indicates a potential conflict between lease lots 1 and 2A and the proposed road ROW. Penny Adler, Chief of Northern Region Rural Airport Leasing, stated that a lease has only been issued for Lot 1 but it has not been surveyed at this time. The LO drawing provides dimensions for the lease lots but does not locate the lots within the airport boundary. The lot locations were imported into our project drawing file using the LO .dwg file and are considered approximate.

Parcel 2: This parcel represents the portion of the proposed ROW that lies within the DNR managed tidelands of Kivalina Lagoon and is within the Kivalina Airport boundary. An Interagency Land Management Assignment (ILMA), ADL 412110 was issued for these tidelands on July 12, 1985 and recorded on August 21, 1985 in Book 29/Page 441, Kotzebue Recording District. This ILMA was specifically issued for “airport purposes” and will require an amendment or supplemental ILMA to authorize placement of the road facilities within the tidelands. Parcel 2 will also require a Section 16 FAA approval for non-aeronautical use within the airport boundary.

Parcel 3: This parcel represents the portion of the proposed ROW that lies within the DNR managed tidelands of Kivalina Lagoon to the east of the Kivalina Airport boundary and the easterly tidal boundary of Kivalina Lagoon.

Parcels 4-13: These parcels represent the portion of the proposed ROW that lies within lands conveyed to NANA Regional Corporation, Inc., successor in interest to the Kivalina Sinuakmeut Corporation, the ANCSA Village Corporation for Kivalina. Patent No. 50-2015-0071 was issued for the surface estate of these lands on March 31, 2015. Fee title for the surface estate within the proposed ROW will be reconveyed to the City of Kivalina under the authority of ANCSA Section 14(c)(3).

Platting Obligations

A.S. 9.55.275 replat approval requires an agency of the state acquiring property in fee that results in a boundary change to obtain replat approval from a municipality exercising platting authority. The surface and subsurface estate for parcels 7 through 16 are owned by NANA Regional Corporation and will be conveyed in fee to the City of Kivalina under the terms of section 14(c)(3) of the Alaska Native Claims Settlement Act. 14(c)(3) reconveyances are excluded from the definition of “subdivision” according to section 8.16.020 “definitions” of the Northwest Arctic Borough code. All other parcels identified for this project will be acquired as easement interests in the name of the City of Kivalina or the State of Alaska and require no dedication or platting approval.

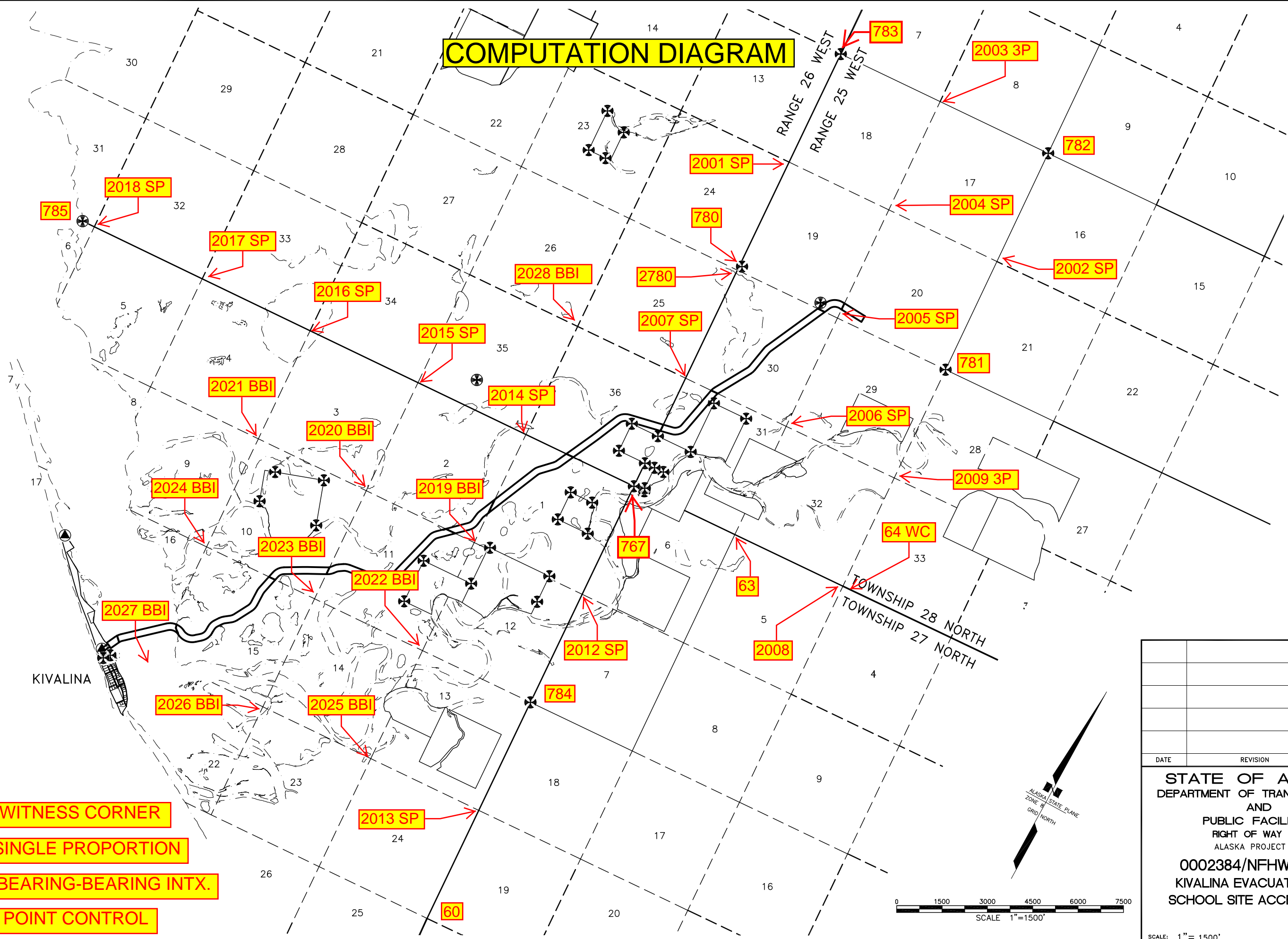
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COMPUTATION DIAGRAM

- WC = WITNESS CORNER
- SP = SINGLE PROPORTION
- BBI = BEARING-BEARING INTX.
- 3P = 3 POINT CONTROL



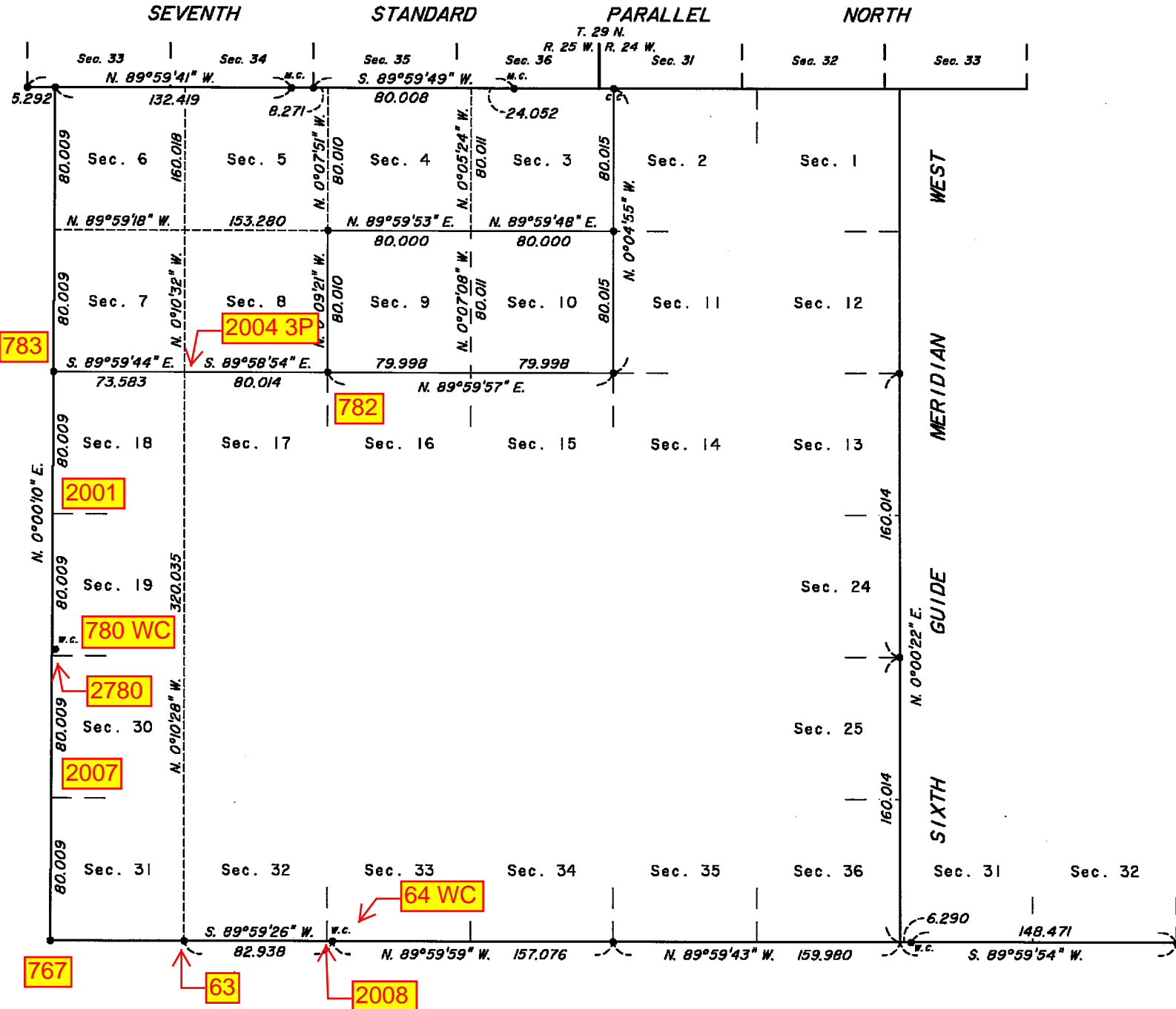
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STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND
 PUBLIC FACILITIES
 RIGHT OF WAY MAP
 ALASKA PROJECT NO.
 0002384/NFHwy00162
 KIVALINA EVACUATION AND
 SCHOOL SITE ACCESS ROAD

CALCULATION DIAGRAM

293

Township 28 North, Range 25 West, Kateel River Meridian, Alaska



This diagram reports bearings and distances to the controlling positions defined by the relationship of identified recovered corners with the protracted lines shown on the official plat of survey accepted December 28, 1978.

Distances are shown to the nearest 0.001 chain and bearings to the nearest second on this diagram, however the information reported on the plat and in the field notes has been rounded to the nearest 0.01 chain and nearest minute of arc.