AMENDMENT 1 TO THE INTERLOCAL SERVICES AGREEMENT BETWEEN CITY OF EVERETT AND SNOHOMISH COUNTY

This Amendment 1 to the Interlocal Agreement between City of Everett and Snohomish County ("Amendment 1") is entered into on the _____ day of _____, 2024 by and between Snohomish County, a political subdivision of the State of Washington (the "County"), and City of Everett, a Washington public agency ("Everett").

RECITALS

Whereas, the County and City of Everett entered into that certain agreement executed on December 11, 2020, entitled "Interlocal Agreement" (the "Agreement"); and

Whereas, the Department of Natural Resources ("DNR") has contracted with Quantum Spatial to collect, process, and deliver certified Lidar data, imagery, and derivative products for several counties in Washington State; and

Whereas, the cost for the Snohomish County region Lidar data is Sixty-Six Thousand Eight Hundred Sixty-Four Dollars ($66,864.00); and

Whereas, the County executed a Cost Share Agreement on August 19, 2024, to pay DNR Forty-Eight Thousand Two Hundred Twenty-Four Dollars ($48,224.00)(the "DNR fee") and receive the Lidar data for the Snohomish County region (including Everett and Marysville); and

Whereas, Everett has requested Everett's portion of the Snohomish County region Lidar data; and

Whereas, Everett's portion of the DNR fee is Twenty-One Thousand Two Hundred Sixty-Eight Dollars ($21,268.00) as shown in Supplemental Work Order WO 20-02.

AGREEMENT

NOW, THEREFORE, in consideration of the covenants hereinafter set forth and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the County and Everett agree as follows:

1.   Exhibit A, SWO 20-02 Lidar Data, is hereby attached to this Amendment 1 and by this reference incorporated into the Agreement.

2.   Except as expressly provided in this Amendment No. 1, all of the terms and conditions of the Agreement remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment No. 1 to be duly executed as of the date set forth above.

SNOHOMISH COUNTY   **CITY OF EVERETT**

                                                                            09/05/2024
_____   _____
Snohomish County Executive   Date   Title: Cassie Franklin, Mayor   Date
                                    Ken Klein
                                    Executive Director
Approved as to form only:

Wendling,   Digitally signed by Wendling,
Rebecca   Rebecca
                   Date: 2024.08.20 12:53:57 -07'00'
_____

APPROVED AS TO FORM
OFFICE OF THE CITY ATTORNEY
EVERETT

Attest:
EVERETT   Office of the City Clerk

Exhibit A - Supplemental Work Order (SWO 20-02)

Lidar Data

This Supplemental Work Order (SWO 20-02) is executed between Snohomish County, through its Department of Information Technology (the "County" or "SCDOIT") and City of Everett ("Everett") pursuant to the terms and conditions of that certain Interlocal Agreement ("ILA") between Everett and Snohomish County to Provide Information Services dated December 11, 2020. The parties acknowledge that they have read and understand the terms and conditions therein. All rights and obligations of the parties shall be subject to and governed by the terms of the ILA.

1. **Purpose:** The purpose of this SWO 20-02 is for SCDOIT to provide Lidar data for Everett from the Department of Natural Resources. Services include the collection, processing, and delivery of Lidar data, imagery, and derivative products provided by a specific work order between DNR and Quantum Spatial, which is described in Attachment 1, "Mapping Services for Washington State Six Counties and the Thurston, Adams, and Snohomish Gap Lidar Project" 'Option B'.

2. **Term and Termination:** The term of this SWO 20-02 is effective upon the date of execution by both parties through December 10, 2025, unless terminated upon written notification to the other party. Either party may terminate this SWO 20-02 upon ninety (90) day's written notification to the other party. In the event the ILA is terminated, this SWO 20-02 shall also terminate on the ILA termination date.

3. **Prohibited Use of Services:**
   a. Everett shall not use any Service in a manner that Snohomish County reasonably determines may adversely affect Snohomish County systems, Snohomish County customers, the integrity and operations of Snohomish County's business, or Snohomish County's ability to provide services to Snohomish County customers.

4. **Resale of Snohomish County Services:** Everett shall not resell or provide free of charge any Service to any third party without first entering into a Contract for Service with Snohomish County that permits these activities.

5. **Modifications / Changes:** Services may be modified at any time upon mutual written agreement of the parties. Modifications that remain within the ILA Contract Maximum will be made through the issuance of a new SWO, which will take precedence over the original SWO.

6. **Assignment:** Neither party shall assign any of the rights, duties, or obligations covered by this SWO 20-02 without the prior express written request and consent of each party.

7. **SWO Management**: Unless otherwise indicated, all correspondence regarding this SWO 20-02 should be directed to:

Everett Primary Contact: Chris Fadden, Information Technology Director
                                City of Everett
                                2930 Wetmore Avenue
                                Everett, WA 98201
                                (425) 257-7701

SCDOIT Primary Contact: Ed Whitford, GIS & Data Supervisor
GIS Support Services   Snohomish County
                                Department of Information Technology
                                3000 Rockefeller Avenue, M/S 709
                                Everett, WA 98201
                                (425) 262-2150

8. **Summary of Costs:** Everett shall pay the County a total cost of $21,168.00 for the
   Everett Lidar data. County will provide an invoice for these Services to Everett after
   January 1, 2025.

Services	Qty (sq. miles)	Cost
Lidar Data	63	$21,168.00

By their signatures, County and City of Everett hereby acknowledge and accept the terms and
conditions of this SWO 20-02.

Approved

City of Everett

Signature

Cassie Franklin

Print or Type Name

Mayor   09/05/2024

Title   _Date_

Approved

Snohomish County

Snohomish County Executive

Print or Type Name   Ken Klein

                       Executive Director

Title   _Date_

APPROVED AS TO FORM
OFFICE OF THE CITY ATTORNEY
EVERETT

Attest:
EVERETT   Office of the City Clerk
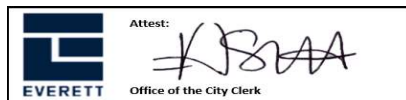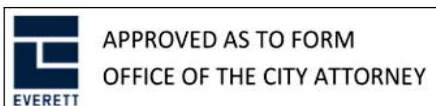
RE: Mapping Services for Washington State Six Counties and the Thurston, Adams, Snohomish Gap Lidar Project

NV5 Geospatial (NV5G, Inc.) appreciates the opportunity to present Washington State Department of Natural Resources (DNR) and project partners with a quote and brief statement of work for geospatial mapping services throughout the state of Washington. The following provides an overview of services, including product deliverables and timeline. All specifications and deliverables follow those outlined in the NV5G, Inc. proposal response to the Lidar RFP No. 22-03 issued by   DNR RFP. This Scope of Work will be useful for a US Geological Survey 3D Elevation Program (3DEP) Data Collaboration Announcement (DCA) submission by DNR.
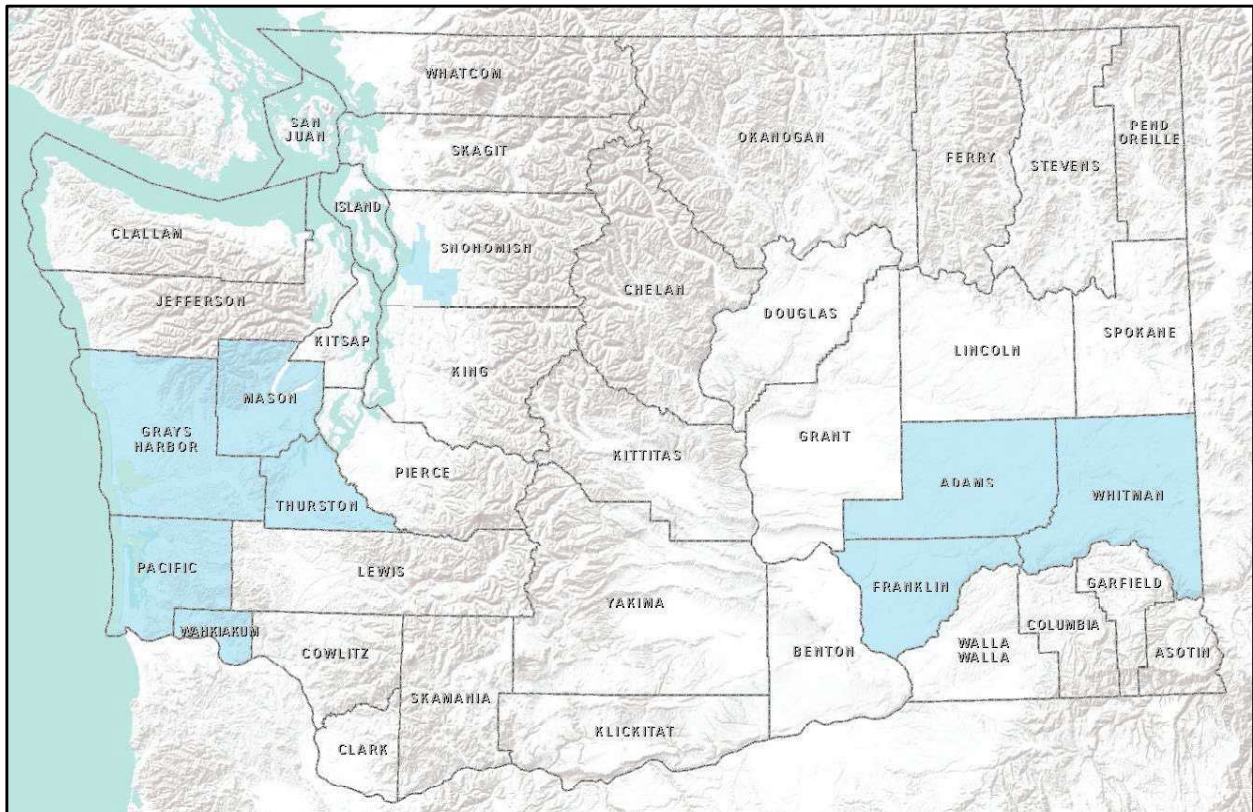

Figure 1: Areas of interest throughout the state. See Exhibit A for more detail on optional areas.

NIR (Near Infrared Topographic) Lidar
NV5G, Inc. will collect NIR Lidar data using a high pulse rate Lidar system to produce a highly accurate, high resolution ≥ 8 pulses/m^2 Lidar dataset with no gaps and ample buffers (at least 100m) around project boundaries. Data will be collected at a minimum of 40º field of view (+/-20º from nadir), with sufficient overlap among swaths to minimize gaps and laser shadowing. The Lidar system records up to four range

Lidar Specifications Summary	
Multi-Swath Pulse Density	≥ 8 pulses/m^2
Returns Collected Per Laser	At least 3
Intensity Range	1-65535 (16 bit)
Vertical Accuracy (σ), *slope*	≤ 10 cm
Horizontal Accuracy (σ)	≤ 30 cm

measurements (returns) per pulse (first, second, third, and last). All overlapping flight lines will be flown in opposing directions to maximize detection of swath-to-swath inconsistencies and used to resolve system misalignments. Using a combination of automated and manual techniques that are tailored to the particular land cover and terrain of the study area, Lidar processing will include kinematic corrections, calculation of laser point position, relative accuracy testing and calibrations, classification of ground and non-ground points, assessments of statistical absolute accuracy, and creation of ground surface models.

Survey Control
NV5G, Inc. survey team will perform the ground survey work. Depending on acquisition logistics (configuration of sites, access, schedule, and weather), the team will use one or more appropriate methods to enable geo-spatial correction of aircraft positional coordinate data. These include conventional base supported ('BS') survey control, TerraPos® Precise Point Positioning ('PPP'), or Trimble® CenterPoint™ Post-Processed Real-Time Extended ('PP-RTX'). To verify Lidar point calibration and enable accuracy assessment, NV5G, Inc's field crew will collect ground check points (GCPs) using GPS-based real-time kinematic (RTK) survey techniques. For an RTK survey, the ground crew uses a roving unit to receive radio-relayed corrected positional coordinates for all ground points from a GPS base unit set up over a survey control monument. The roving unit records precise location measurements with an error (σ) of ≤ 3 cm relative to the base control. NV5G, Inc's team will distribute a suitable number of hard, bare earth ground check points (GCPs) on level slope throughout project areas, as feasible given road access and GPS conditions.

NV5G, Inc. will collect checkpoints for the Non-vegetated Vertical Accuracy/Vegetated Vertical Accuracy (NVA/VVA) calculations. Per the latest American Society of Photogrammetry and Remote Sensing (ASPRS) recommendations, NV5G, Inc. will require additional NVA and VVA points as shown in Table 1. All checkpoints for VVA will fall within the Digital Elevation Model (DEM) footprint. All ground survey operations will be conducted under the supervision of a Washington State professional licensed surveyor who will also certify the accuracy of control monument locations. The techniques for establishing all ground check points will be outlined in the Report of Survey, including the identity, locations, and position residuals of all GCPs used to evaluate survey accuracy.

Area	NVA Count	VVA Count	Calibration Points
WALiY2 6,830,080 acres (10,672 square miles)	125	35	235

Table 1. NVA/VVA Checkpoint and Calibration Point Count

The following vertical accuracies will be met or
    exceeded:

o   RMSEz $\leq$ 10 cm (non-vegetated Swath, DEM)

o   NVA $\leq$ 19.6 cm 95% Confidence Level
    (Swath, DEM)

    o   VVA ≤ 30 cm 95th Percentile (DEM)

Processing

Generally, Lidar processing tasks include GPS control computations, kinematic corrections, calculation of laser point position, calibration for optimal relative and absolute accuracy, classification of ground and non-ground points, and creation of ground/digital service models (DSM) . Bare earth classification is accomplished using an automated ground modeling process with visual QA/QC inspection to identify any misclassifications. NV5G, Inc. will employ Lidar ground model parameters appropriate for the project land cover and terrain based on our experience. All methodology and subsequent data products will comply with the most recent U.S. Geological Survey (USGS) Lidar Base Specifications.

The bare earth DEM will be hydroflattened to ensure all water bodies are cartographically acceptable and that streams are at or below surrounding terrain. NV5G, Inc. hydroflattening methods use a combination of automated feature edge detection and traditional LiDARgrammetric techniques. The 3-D hydro-line will be used for reclassifying ground points within the wetted area or channel to 'water.' Ponds and lakes > 2 acres in size will be hydroflattened at a single elevation with the entire water surface edge at or below the immediate surrounding terrain. Long impoundments whose elevations drop moving downstream will be treated as a river. For rivers > 30 m (100') in average width, hydro-lines will follow the direction of flow (gradient to follow the immediate surrounding terrain) and will be flat and level from bank to bank and at or below immediately surrounding terrain. Streams will break at road crossings, but road fills will not be removed from the DEM. Bridges will be delineated and removed from the DEM. Variations in water surface elevation from tidal variations will not be removed. However, a pseudo-line (no elevation values) will be generated along the tidal shoreline to depict the best estimate of the water's edge at time of collection.

Most Current Version of USGS Lidar Base Specification (LBS) Deliverables

Classified Point Cloud
- <u>Fully compliant Lidar Aerial Survey (LAS) v1.4</u>, Point Record Format 6, 7, 8, 9, or 10 including "File Source ID."
- Proper use of the LAS withheld and overlap bits is required. Outlier, blunders, geometrically unreliable points near the extreme edge of the swath, and any other points the data producer deems unusable are to be identified using the withheld bit flag, as defined in LAS specification version 1.4-R13 (ASPRS, 2011).Use of the overlap bit flag is intended to identify overage points, which are described as those points within a given swath that would be excluded when constructing a coverage with a uniform depth of swaths at any location within the project
- Geo-reference information included in LAS header (OGC WKT).
- GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each return. In compliance with LAS specification requirements, the encoding tag in the LAS header must be properly set.
- Tiled delivery, without overlap
- <u>Classification Scheme</u> (minimum):
    o   Class 1 – Processed, but unclassified
    o   Class 2 – Bare-earth ground
    o   Class 7 – Low Noise (low, manually identified, if necessary)
    o   Class 9 — Water

- o Class 17 — Bridge Decks
- o Class 18 – High Noise (high, manually identified, if necessary)
- o Class 20 — Ignored Ground (break line proximity)
- o Class 21 – Snow (where reliably identified)
- o Class 22 – Temporal Exclusion (typically non-favored data in intertidal zones)

Class 1 will be used for feature points that are not in Classes 2, 7, 8, 9, 10, 17 or 18. These typically represent returns from man-made structures, vegetation etc.

Class 7 will be used for artifacts that do not represent the ground, manmade structures or vegetation. Typically, these are extraneous points that are below the surface not representing any true feature.

Class 18 will be used for artifacts that do not represent the ground, manmade structures or vegetation. Typically, these are extraneous points that are well above the surface not representing any true feature. No points will be deleted from the LAS file.

Hydro-flattened Bare Earth Surface (Raster DEM)
- Cell Size no greater than 1.5 U.S. Survey Feet for QL1, and no less than the design Aggregate Nominal Pulse Spacing (ANPS).
- Delivered in industry-standard, GIS-compatible, 32-bit floating point raster format in Geographic Tag Image File Format (GeoTiff)format.
- Geo-reference information will be included in raster file.
- Tiled delivery, without overlap or gaps.
- Tiles will be suitable for creating seamless data mosaics.
- DEM tiles will show no edge artifacts or mismatches.
- Void areas (i.e., areas outside the project boundary but within the tiling scheme) will be coded using a unique "NODATA" value. This value will be identified in the appropriate location within the file header.
- A report on the assessed absolute vertical accuracy (NVA and VVA) of the bare-earth surface in accordance with the guidelines set forth in the "Positional Accuracy Standards for Digital Geospatial Data" (American Society for Photogrammetry and Remote Sensing, 2014). Absolute vertical accuracy requirements using the ASPRS methodology for the bare-earth DEM are listed in "Absolute vertical accuracy for digital elevation models, Quality Level 0– Quality Level 3 (table 5).
- Depressions (sinks), natural or man-made, are not to be filled (as in hydro-conditioning and hydro-enforcement).
- Water Bodies (ponds and lakes), wide streams and rivers ("double-line"), and other non-tidal water bodies as defined in Section III are to be hydro-flattened within the DEM.
- Bridges (as defined in the USGS Lidar Base Specification V2.0) will be removed from the DEM. Roads or other travel ways over culverts will remain intact on the surface.
- The bare earth surface below a bridge will be a continuous logical interpolation of the apparent non-hydrographic terrain lateral to the bridge deck. Where abutments are clearly visible, the bare earth interpolation will begin at the junction of the bridge deck and approach structure. Where this junction is not clear, NV5G, Inc. will use their best judgment to delineate the separation of below-bridge terrain from elevated bridge surface.
- No geometric change will be made to the originally computed Lidar points. Bare-earth Lidar points that are near break lines will be classified as Ignored Ground (class value equal to 10) and will be excluded from the DEM generation process. This process prevents unnatural

surface artifacts from being created between mass points and break line vertices. The proximity threshold for reclassification as Ignored Ground is at the discretion of the data producer, but in general will not exceed the aggregate nominal pulse spacing (ANPS).

- Streams, rivers, and water bodies meeting the criteria for hydro-flattening will be monotonically continuous where bridge decks have been removed.
- Any break lines used to enforce a logical terrain surface below a bridge will be considered a required deliverable. **Digital Surface Model (DSM)** product will have same resolution, format and tiling specifications as the Raster DEM.

Break Lines:

- Break lines for all hydro-flattened areas will be delivered, regardless of technique used for hydro-flattening the DEM.
- Break lines will be delivered in ESRI file geodatabase formats, as PolylineZ and PolygonZ feature classes, as appropriate to the type of feature represented and the methodology used by the data producer.
- Break lines will be developed to the limit of the buffered project boundary area.
- Break lines will be delivered in the same coordinate reference system and units (horizontal and vertical) as the Lidar point delivery.
- Break line delivery may be in a single layer or in tiles, at the discretion of the data producer.
- In the case of tiled deliveries, all features will edge-match exactly across tile boundaries in both the horizontal (x, y) and vertical (z) spatial dimensions.
- Delivered data will be sufficient for the USGS to effectively re-create the delivered DEMs using the Lidar points and break lines without substantial editing.

Intensity Image

- 1.5 U.S. Survey Feet cell size
- Intensities 16-bit, linear rescaled
- Image 8-bit, 256 color gray scale and GeoTIFF format • Images will be tiled to match the Classified LAS and DEMs.

Swath Separation Images

Delivery Diagram: A final project-wide delivery diagram is required for QL1 projects over 1,000 square miles. At the completion of acquisition NV5G, Inc. will supply a diagram delineating the delivery blocks.

Metadata: Task Order requirements will be met and generally include:

- Ancillary products used to support processing of the Lidar dataset will be delivered.
- Collection Report detailing mission planning and flight logs. Additionally, a flight index will be delivered as an ESRI file geodatabase. Flight index will contain flight line ID, acquisition date, start time and end time for each flight line.
- Georeferenced, polygonal extents detailing actual coverage of each of the Lidar swaths will be delivered as defined in the referenced Version 1.3 specification. Esri geodatabase is required.
- Survey Report detailing the collection of control and reference points used for calibration and QA/QC.
- Processing Report detailing calibration, classification, and product generation procedures including methodology used.

- QA/QC Reports (detailing the analysis, accuracy assessment and validation of:
  - The point data (absolute, within swath, and between swath)
  - The bare-earth surface (absolute)
  - All other optional deliverables, if appropriate
- Control points and check points: All control and check points used to calibrate, control, process, and validate the Lidar point data or any derivative products are to be delivered. **All check points will be delivered with each delivery block.**
- Geo-referenced, digital spatial representation of the precise extents of each delivered dataset. This should reflect the extents of the actual Lidar source or derived product data, exclusive of Triangular Irregular Network (TIN) artifacts or raster NODATA areas. A union of tile boundaries or minimum bounding rectangle is not acceptable. Esri Polygon shapefile is preferred.
- Product metadata (Federal Geographic Data Committee (FGDC) compliant, XML format metadata). One file for each:
  - Tiled deliverable product group (classified point data, bare-earth DEMs, etc.) Product group metadata should contain contents unique and specific to that product group, a renamed copy of the project level metadata is not sufficient. Metadata files for individual tiles are not required.

Note that the NGP version 1.3 of the Lidar Base Specification, has a modified XML metadata template to reflect other updates in the specification, careful review is advised.

Project Report: NV5G, Inc. will deliver a production report which details:

- A record of fieldwork procedures.
- Data derivation and adjustments.
- Quality control procedures and results.
- Any problems encountered, and solutions used in resolving such problems.
- Statistical report summarizing the results of the airborne GPS adjustment and the overall accuracy of the adjusted IMU data.
- The Production report will be Microsoft Word, Adobe PDF format or another compatible digital format.

Acquisition Reports: NV5G, Inc. will provide regular progress updates to the technical point of contact throughout the data acquisition process.

- Update frequency will be based upon the collection period, but no less than once a week.
- Reports will be delivered as shapefiles which represent the geographic extent of the acquired data.
- Updates will commence at acquisition onset and will continue until acquisition is complete.

Projection Information
- Washington State Plane South, North American Datum of 1983 (NAD83) High Accuracy Reference Network (HARN), North American Datum of 1988 (NAVD88) (Geoid 12b), US Survey Feet.

Tiling Scheme

 DNR Format: All geospatial products will be delivered in a 4500 x 4500-foot tiling scheme unless otherwise specified. ESRI grids and shapefiles will have complete and correct associated projection files. Tiled products will be edge matched, without gaps or overlap.

Block Delivery Plan – Shapefile format once majority of acquisition is complete.

Schedule & Timeline

NV5G, Inc. will work with DNR to coordinate data collection to coincide with optimal weather conditions and as best meets the needs of the project. Collection will occur during leaf off and snow-free conditions. All products will be delivered before the term of the contract ends (1 year) and as block deliveries as planned by the Project Manager and DNR.

Cost Estimate

Lump sum costs are provided below for the study areas portrayed in Figure 1 and in Exhibit A, assuming timeline and deliverables listed above. Changes in the size and/or shape of the areas of interest will result in modifications to the cost structure. Costs include mobilization, acquisition, survey, processing of products and reporting. *Option A*	*Cost*
Six Counties (7,770 square miles)	$2,657,323
Option B	**Cost**
Thurston County (773 sqmi)	$259,730
Adams County (1929 sqmi)	$648,144
Snohomish County (115 sqmi)	$38,640
City of Everett (63 sqmi)	$21,168
City of Marysville (21 sqmi)	$7,056
Option B Total	**$974,738**

EXHIBIT A

Option A – "Six Counties" in blue, approximately 7,770 square miles.
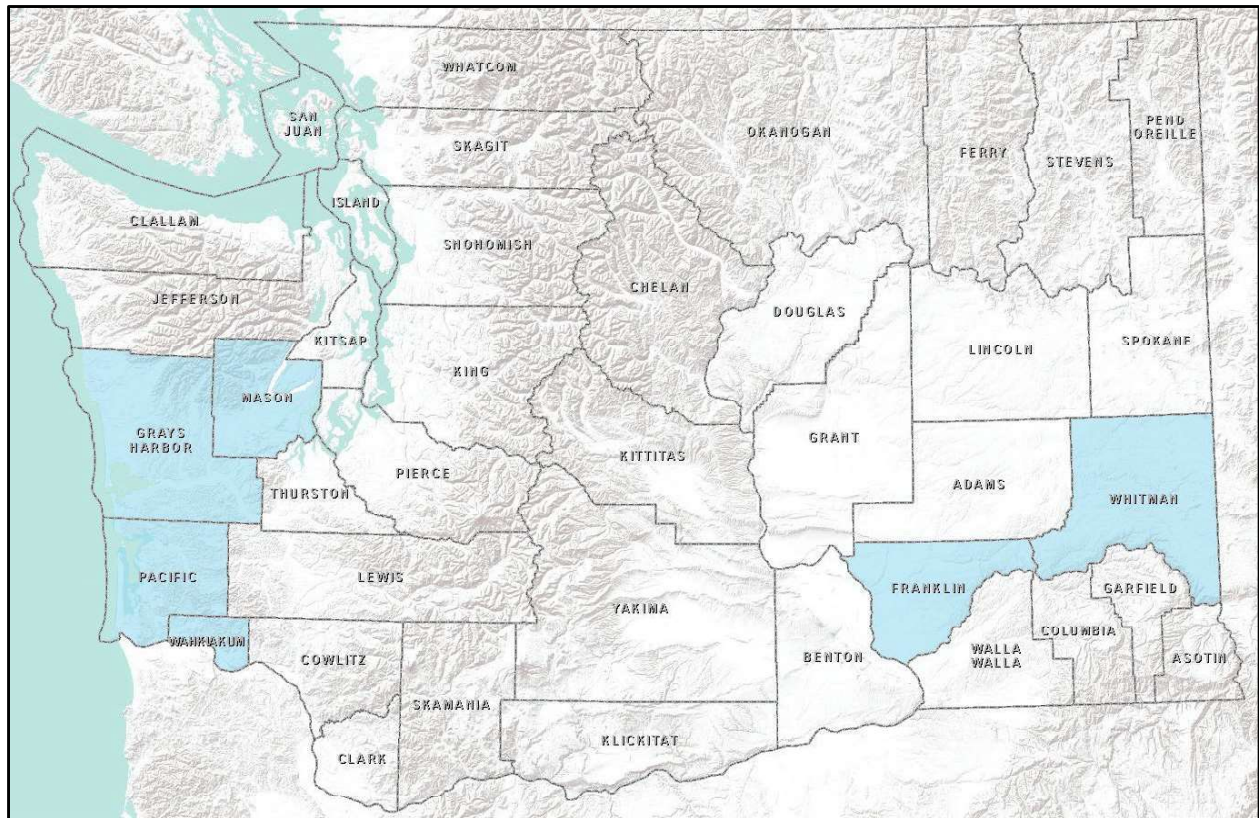
Option B – "Thurston, Adams, Snohomish Counties and Cities of Marysville and Everett" approximately 2901 square miles.
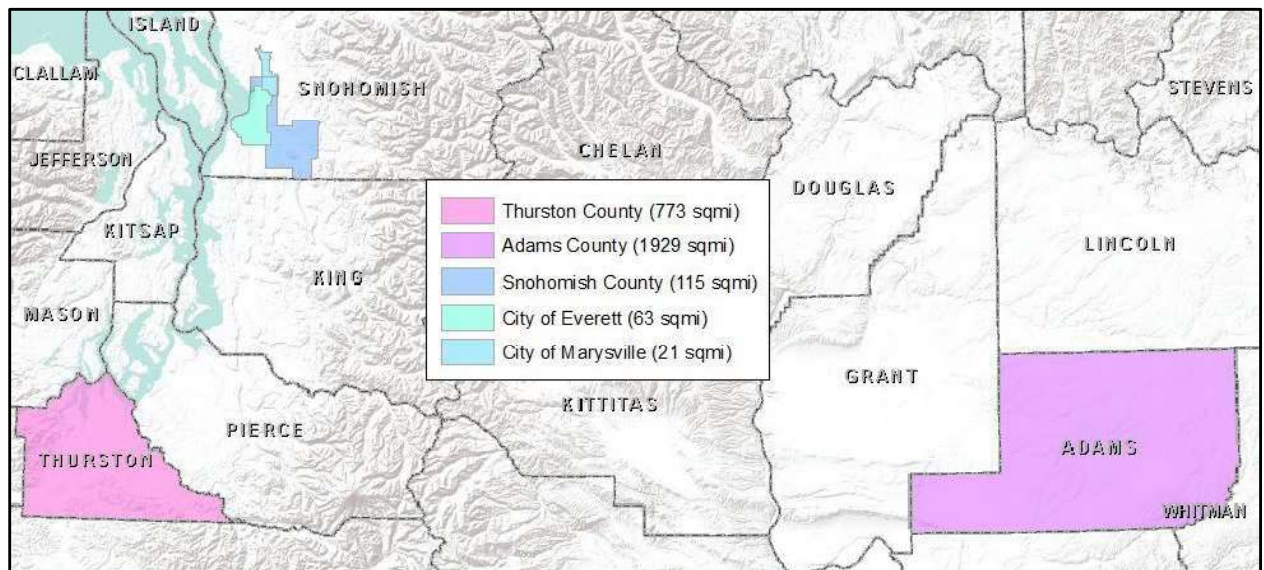
Snohomish County Tech Services ILA Amendment 1_revSD

Final Audit Report   2024-09-05

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