

GIS PRODUCT STANDARDS

TECHNICAL SPECIFICATIONS DOCUMENT

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1. INTRODUCTION

This Geographic Information Systems (GIS) Product Standards document contains standards and specifications for the delivery of GIS data and products to the City of SeaTac. These GIS Product Standards were developed with the intent to improve the quality of data, maps, and GIS documentation delivered to the city through contracts, agreements, and other collaborative activities. These standards were developed to meet the City's specific needs and are updated as needed to conform to current industry workflows. The GIS Product Standards document begins with a section on GIS Project Milestones and ends with a section which will be customized with additional details specific to each project.

2. GIS PROJECT MILESTONES

GIS Project Milestones are key points in a project where conversations or reviews need to occur to ensure contractor and staff time are being used most efficiently. Conversations about existing and proposed data should eliminate the redundant collection or development of data, reducing the level of effort and cost on a project, and promoting more efficient use of public funds.

When a project will use or produce spatial data the City GIS Coordinator should be included in the following steps:

1. **Initial Project Scoping:** GIS Coordinator will review draft Request for Qualifications (RFQ) or Request for Proposal (RFP) and identify likely data inputs and gaps which can be used to refine the RFQ and/or RFP and Scoping.
2. **Project Kick-Off Meeting:** GIS Coordinator will attend meeting to understand additional project context, constraints, considerations, and objectives, which are all important for identifying appropriate data, tools, and products.
3. **A GIS Data Inputs, Gaps, and Outputs Meeting:** Discussion to verify all data inputs needed, data gaps, and planned outputs. The City of SeaTac GIS develops and maintains an extensive catalog of GIS data to support city operations and may already have the data needed to meet project goals. Discussion of outputs is important so that contractor and SeaTac staff understand how the products will be used and integrated into existing City data and systems.
4. **Review of Draft GIS Product Deliverables:** GIS Coordinator will verify that data, analysis, and products look as expected before final delivery is accepted. (There can be multiple meetings or reviews if needed.)
5. **Review of Final GIS Product Deliverables:** GIS Coordinator will verify final deliverables are accurate, complete, and meet standards.

The remainder of this document describes the standards for GIS product deliverables.

3. DATA SPECIFICATIONS

3.1 PROJECTIONS, COORDINATE SYSTEMS, AND DATUMS

All spatial data delivered needs to be in the following projected coordinate system:

NAD_1983_HARN_StatePlane_Washington_North_FIPS_4601_Feet

Additional details:

Projected Coordinate System:

NAD 1983 HARN StatePlane Washington North FIPS 4601 (US Feet)

WKID: 2926 Authority: EPSG

Linear units are U.S. Survey Feet (1 foot equals 0.3048006096 meter)

Geographic Coordinate System:

NAD 1983 HARN

WKID: 4152 Authority: EPSG

Angular Unit: Degree (0.0174532925199433)

Prime Meridian: Greenwich (0.0)

Datum: North American Datum of 1983 HARN. Vertical datum is NAVD88.

Spheroid: GRS 1980

Semimajor Axis: 6378137.0

Semiminor Axis: 6356752.314140356

Inverse Flattening: 298.257222101

Additional resources related to this projection can be found at Spatial Reference.org:

http://spatialreference.org/ref/sr-org/nad_1983_harn_stateplane_washington_north_fips_4601_feet/

3.2 HORIZONTAL AND VERTICAL MAP ACCURACY

When appropriate, data collection and processing methods will be selected so that the final printed maps shall meet or exceed the National Map Accuracy Standards (NMAS) for the appropriate scale. (See USGS Map Accuracy Standards Fact Sheet 171-99, November 1999 for details <https://pubs.er.usgs.gov/publication/fs17199>). When digitizing features from imagery, data should be created at a scale appropriate for the imagery resolution.

3.3 FILE NAMES

Electronic files names should follow the general rules listed below. Electronic files include: GIS feature classes, Computer-Aided Design (CAD), Global Positioning System (GPS) data, tabular data, digital images, reports, and reference material.

General rules for electronic file names:

- File name shall be succinct and descriptive (Note: long file and path names of more than 128 characters may not allow backup onto external hard drives).

- When applicable, standard geographic location acronyms or abbreviations shall be used (e.g. state/program/park acronym). When acronyms and abbreviations are used, they should be defined in the metadata.
- Avoid using uppercase characters except to concatenate words together or to distinguish program/place acronyms. Use PascalCase, capitalizing the first letter of each word, then lowercase for the rest.
- Do not use spaces in file or directory names.
- Do not use special characters in file and folder names (e.g. -% () # @ . , * & [] / \).
- Use the date for document version control. Embed the version date at the end of the file name. Date shall be in yyyyymmdd format at the end of the file name preceded by an underscore (e.g. FileName_yyyyymmdd.pdf)
- For GIS data, if file names of different feature types are identical, use a suffix for point (point), line (line), polygon (poly), and separate the suffix with an underscore. (e.g. park_point or park_polygon)
- File names must be unique, complete, and interpretable outside of the file structure.

3.4 GIS DATA FORMATS

GIS data should be delivered in a format that is compatible with the current version of ArcGIS Pro.

The following data formats are acceptable:

- Vector: Feature classes in a file geodatabase (.gdb)
- Raster:
 - MrSid image (.sid)
 - TIFF image with world reference file or as a GeoTIFF (.tif,.tfw)

3.5 METADATA

Spatial data needs to contain minimum metadata which is attached to the data delivered (visible in the ArcCatalog metadata tab for each dataset). Metadata shall be provided for all data used in, and created for, project deliverables. It is important to understand that deliverables are not complete without appropriate metadata.

3.5.1 SPATIAL DATA

The Federal Geographic Data Committee (FGDC) has a series of endorsed standards which can be found at <https://www.fgdc.gov/metadata/csdgm-standard>, but at a minimum, the following core metadata elements shall be included for each dataset:

- Tags: Keywords
- Summary: Summary of the purpose of the dataset.
- Description: Description of the contents of the dataset and how it was created.
- Credits: The source/author of the data.
- Use Limitations: Description of any use conditions or limitations.
- Extent: Bounding area.
- Scale Range: Appropriate maximum and minimum scale for the data.

- Field Descriptions: Short description of the contents of each field, which should include definition of units, abbreviations used, or description of nuances.
- If domains, types, or subtypes are used please include documentation explaining the values.

3.5.2 DIGITAL IMAGES/ PROJECT PHOTOS

Photos taken as part of the data collection protocol for a project constitute data and should be organized, documented with metadata, and preserved in conjunction with all other project data. Metadata may be embedded in .tiff and .jpg files by making use of a camera's settings. It is recommended that date and location - capturing features be enabled on cameras. Alternatively, descriptive metadata may be submitted as .xml, or a .doc or .txt document and should include:

- Subject of the image
- Place name where image was taken
- Keyword(s)
- Date Created
- Constraints (explanation of restrictions or copyrights for use of the image)

If images are taken using ArcGIS Field Maps, or similar application, they can be attached to the appropriate feature in GIS and submitted as part of the GIS feature class.

4. ANALYSES

The entire workflow for data creation shall be documented, noting the input variables, environment settings, and the data products created at each step. Depending on the nature of the project, a workflow may be a script (e.g. in python), a ModelBuilder workflow, or it may be noted in an XML or TXT file documenting the process used (i.e. process metadata). If a process will need to be run by SeaTac staff after delivery, the process format needs to be discussed with the GIS Coordinator during the GIS Inputs, Gaps, and Outputs meeting, and the delivery will need to include an appropriate user guide.

5. MAP PRODUCTS

5.1 CITY OF SEATAC MAP TEMPLATE

SeaTac GIS has refined the cartographic display of basemap data to meet city specifications. Contractors should use the City of SeaTac ArcGIS Pro map template as the basis for all map product deliverables, unless otherwise agreed to by the City. SeaTac GIS will provide the map template to the contractor, along with any requested data, after the Data Inputs, Gaps, and Outputs Meeting. Any proposed changes to the map template will need to be approved by the GIS Coordinator.

5.2 MAP PROJECTS

Deliverables shall include any ArcGIS Pro projects used in the creation of final maps, including final symbology and data queries used for display in final maps. Data layer names within the map table of contents should match the final data delivered. Existing cartographic standards for the City of SeaTac shall be incorporated into all mapping deliverables. Please contact the GIS Coordinator if you have any questions about SeaTac cartographic standards.

5.3 MAP PDFS

Any maps created for the final deliverable should be exported from ArcGIS Pro to a final PDF (at 300 dpi, with fonts embedded) and a copy of each PDF included with the ArcGIS Pro deliverables for reference.

5.4 WEB GIS

Projects that will ultimately result in a web based final product, either externally hosted on ArcGIS Online or internally through the City's Portal, will be setup by the City of SeaTac to ensure our internal workflow patterns are maintained, design standards are met, and user experience remains consistent. Demonstration versions of these applications may be setup by the contractor, within their own environment, as proof-of-concept prior to delivery of components. These demonstration versions will be reviewed by City staff prior to delivery to ensure the product meets the needs of the City as defined in the contract. The demonstration version, along with documentation, will be used as a visual guide by GIS staff during implementation. The length of time the contractor's demonstration content is to remain active should be agreed upon in advance.

Contractors delivering products that will be presented in web-based formats should provide the City with Esri ArcGIS Pro project(s) that include all layers to be published, with appropriate symbology, pop-ups fully defined, zoom thresholds set as appropriate, definition queries configured as needed, and metadata attached. Online products, such as web apps that will have specific functionality to meet project needs, should be fully documented and include steps required to implement them. Additionally, deliveries should include JSON files for each web map and web app used in the demonstration.

6. DELIVERABLES

The contractor shall provide a final transmittal to the City of SeaTac that includes the following:

1. GIS Report of the information and processes used during for the project. Please include the following:
 - a. Name of the project.
 - b. List of files delivered.
 - c. Include a short description of the datasets and any information relevant for querying or displaying the data for the project analysis.
 - d. Version and date of the data.
 - e. Information on sensitive data issues (if any exist or as appropriate).

- f. Contact information for those responsible for creating the data and who have the responsibility for maintaining the master version of the data.
2. Finalized ArcGISPro aprx files(s).
3. Final Data (all final data should have complete metadata).
4. PDFs of all Final Maps.
5. Final GIS Tool(s).
6. All raw data, derived data products, and other supporting materials created or gathered in the course of work for the projects.

Data can be submitted via the following:

1. Zipped file attached to an email (for small file sizes).
2. Uploaded to an FTP or file sharing site.

Contractor will be responsible for the quality and completeness of products delivered to the City of SeaTac.

7. ETHICS

Contractors and agency collaborators have an ethical obligation to government agencies and ultimately the public which fund research and development of data products. It is a moral obligation to: be truthful about data representation, provide confidentiality of sensitive data, and to document data processes thoroughly. Resources granted to the contractor for execution of the study will only be used to complete the agreed upon work and should not be used for any other purpose. For example, if SeaTac shares a software license with the contractor it may only be used to complete the agreed upon work.

8. PROJECT SPECIFIC INSTRUCTIONS

<TEMPLATE ONLY – SPECIFIC INSTRUCTIONS WILL BE PROVIDED FOR EACH PROJECT>

Potential additional specific instructions for ____ Project:

1. Since the <PROJECT> is related to asset management, please include the following with datasets: Source, Unique ID, Created By, Created Date, Edited By, Edited Date, Owned By, Managed By, Installed Date, Inspected Date, Condition (using rating scale as agreed upon by stakeholders).
2. Prior to collecting data on an existing <PROJECT> inventory, please provide the proposed Inventory data schema to SeaTac GIS for review.
3. If the proposed <PROJECT> has specific locations, please deliver a Proposed Project Area of Interest GIS feature class.
4. If a non-Esri web mapping application is being proposed to display <PROJECT> data, please identify benefits to using this application, the appropriate method for pushing data to this application, and methods for consuming data from this application.
5. Additional instructions specific to this project will be provided if the scope of work is updated.