



South Jersey
Transportation
Planning Organization

GIS Data Management Plan



June 2025

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ACRONYMS AND ABBREVIATIONS

| Acronym | Full Form |
|----------------|--|
| AGOL | ArcGIS Online |
| APRX | ESRI ArcGIS Pro File |
| CAD | Computer-Aided Design |
| DB | Design Build |
| DB Connection | Database Connection |
| DMP | Data Management Plan |
| ESRI | Environmental Systems Research Institute (Software company providing GIS software) |
| FGDB | File Geodatabase |
| GDB | Geodatabase |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| KML/KMZ | Keyhole Markup Language, Google Earth .kml/.kmz file extension |
| MXD | ESRI ArcMap file |
| NAD | North American Datum |
| NAVD88 | North American Vertical Datum of 1988 |
| QA | Quality Assurance |
| QC | Quality Control |
| SJTPO | South Jersey Transportation Planning Organization |
| SQL | Structured Query Language |
| UTM | Universal Transverse Mercator |
| WGS | World Geodetic System |

VERSION HISTORY

| Version # | Date | Author/Reviewer | Key Differences |
|-----------|------------|-----------------|----------------------|
| 1.A | 03/24/2025 | Sherry Shariat | Draft Version |
| 1.B | 03/28/2025 | Chris Bente | Draft Review |
| 1.C | 05/01/2025 | Sherry Shariat | Updated Draft |
| 1.D | 05/02/2025 | Chris Bente | Updated Draft Review |
| 1.E | 05/12/2025 | Sherry Shariat | Final Draft |
| 1.F | 05/14/2025 | Chris Bente | Final Draft Review |
| 1.G | 06/17/2025 | Sherry Shariat | Final Review |
| 1.H | 06/18/2025 | Chris Bente | Final Version |

Data Management Plan Document Approvals¹

Date

¹ Signature approvals are required for the initial version of this Data Management Plan Document. It is expected that this plan will be incrementally updated as a part of ongoing change management and documentation processes with the SJTPO Team.



1. Introduction

The South Jersey Transportation Planning Organization (SJTPO) has engaged WSP to enhance their Geographic Information System (GIS) data management and procedures. This GIS Data Management Plan aims to establish a comprehensive framework for managing, maintaining, and utilizing GIS data effectively. The plan outlines essential components such as Software Standards, Minimum Metadata Requirements, Geodatabase Schema Requirements, Hierarchical Schema, Directory/Folder Structure, Quality Control (QC) Standards for Data Updates, and Workflow for Publishing and Managing Content in ArcGIS Online (AGOL). By implementing these guidelines, SJTPO will ensure the integrity, accessibility, and reliability of their GIS data, thereby supporting informed decision-making and efficient transportation planning.

This document includes detailed guidelines on the project directory structure, GIS standards and requirements, quality control processes, layout templates, and a workflow for publishing and managing content in AGOL. It covers the hierarchical organization of GIS data, software standards, coordinate system standards, geodatabase schema requirements, metadata standards, quality control measures, and best practices for AGOL management. Additionally, it provides templates for various layouts to ensure consistency and standardization in the presentation of GIS data and maps.

The implementation of this GIS Data Management Plan is crucial for ensuring that SJTPO's GIS data is managed in a structured and efficient manner. By adhering to the guidelines and standards outlined in this plan, SJTPO will be able to maintain high-quality data that is easily accessible and reliable for various applications. This plan not only supports the organization's current needs but also provides a scalable framework that can adapt to future technological advancements and evolving project requirements. Ultimately, the successful execution of this plan will enhance SJTPO's ability to make informed decisions, optimize transportation planning, and improve overall operational efficiency.



2. Project Directory Structure

A consistent and well-maintained project directory structure will greatly assist overall GIS data access, organization and management. Figure 2-1 below illustrates the structure of the *Main Directory (J Drive)* used to support SJTPO with data storing, maintenance, and management.

2.1. Main Directory

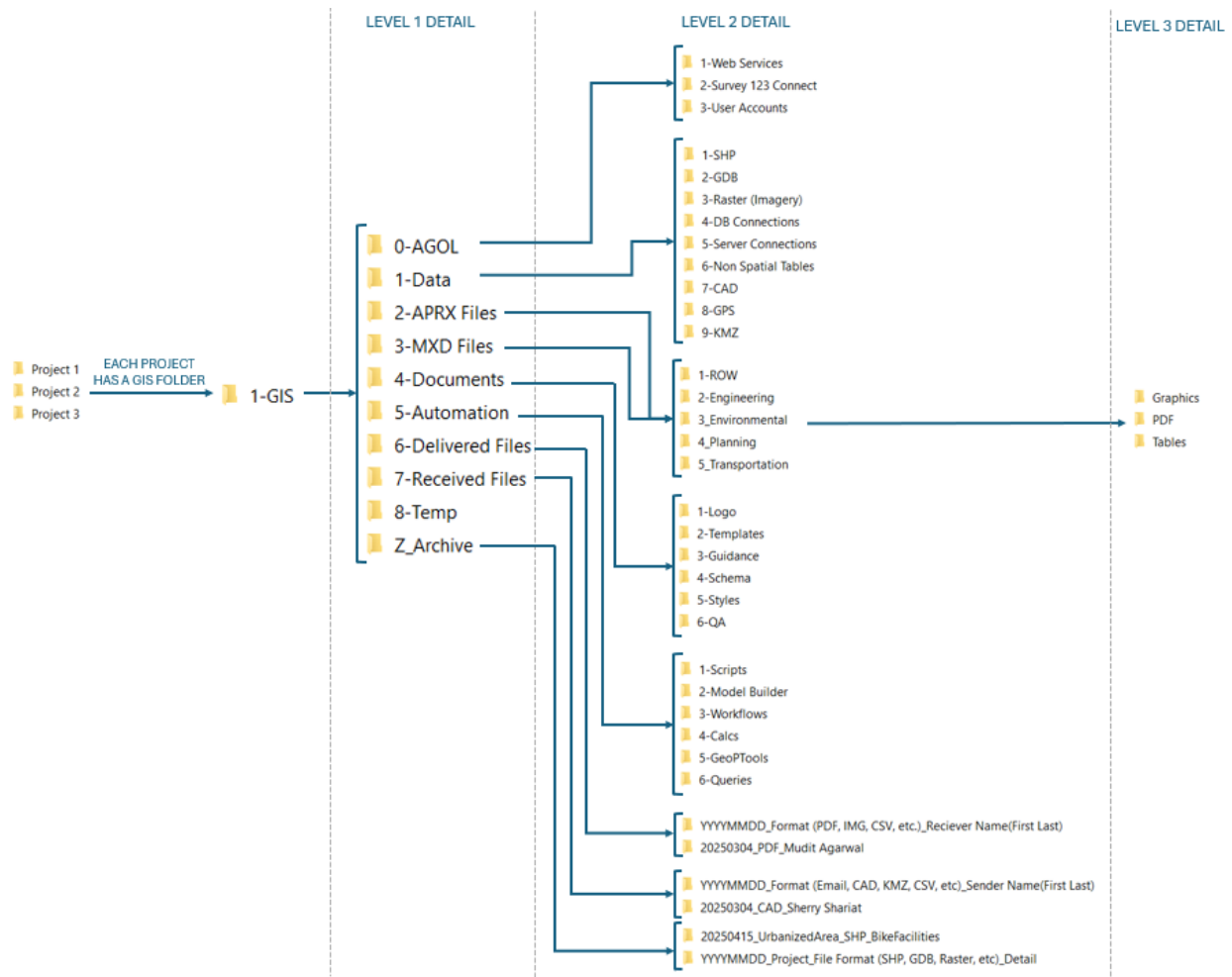


Figure 2-1: Directory Structure

This hierarchical GIS folder structure provides a systematic approach to organizing GIS data for each project. At the top level, **each project has its own dedicated GIS folder**, ensuring that all data related to a specific project is contained within a single, easily accessible location. Within each project folder, there are multiple levels of detail to further categorize and manage the data. **Level 1 Detail** includes the most general and overarching information, serving as the foundation for the project's GIS Information. **Level 2**



Detail delves deeper, providing more specific and detailed information and datasets that build upon the Level 1 information. Finally, **Level 3 Detail** is dedicated to organizing exported and prepared outputs based on file types and formats, facilitating efficient file storage and search. This tiered structure enhances data organization, accessibility, and management, ensuring that users can efficiently locate and utilize the appropriate level of detail for their needs.

2.2. Level 1 Detail

Level 1 Detail in the hierarchical GIS folder structure encompasses the most general and overarching information for each project. This level includes several key folders that provide a broad overview and foundational datasets for the project. By organizing these components at Level 1, users can quickly access the fundamental information needed to understand the project's overall framework and objectives.

- **Data:** Contains raw and processed data essential for the project.
- **APRX (ArcGIS Pro):** Stores project files specific to ArcGIS Pro.
- **MXD (ArcMap):** Stores project files specific to ArcMap.
- **Documents:** Holds important project documentation, reports, and reference materials.
- **Automation:** Designated for scripts and tools that automate GIS processes.
- **Delivered Files:** Manages files that have been delivered to external parties.
- **Received Files:** Manages files that have been received from external parties.
- **Temps:** Used for temporary files that are not yet finalized.
- **Archive:** Stores historical data and previous versions of files for reference.
- **AGOL:** Stores files that are published in ArcGIS Online (AGOL).

2.3. Level 2 Detail

2.3.1. Data Folder

The **Data** folder in Level 1 is a crucial component of the hierarchical GIS folder structure, serving as the repository for all essential datasets required for the project. This folder is further organized into several Level 2 subfolders, each dedicated to specific types of data, ensuring efficient data management and accessibility.

- **SHP:** Contains shapefiles, which are vector data formats used for geographic information system (GIS) software.
- **GDB:** Stores geodatabases, which are databases designed to store, query, and manage spatial data.



- **Raster (Imagery):** Includes raster data and imagery, such as satellite images and aerial photographs.
- **DB Connection:** Holds database connection files that facilitate access to external databases.
- **Server Connection:** Contains server connection files for accessing GIS servers and services.
- **Non-Spatial Table:** Stores tables that contain non-spatial data, which can be linked to spatial data for analysis.
- **CAD:** Includes Computer-Aided Design (CAD) files, which are often used in engineering and architectural projects.
- **GPS:** Contains GPS data files, which include coordinates and other location-based information collected from GPS devices.
- **KMZ:** Stores KMZ files, which are compressed KML files used for displaying geographic data in applications like Google Earth.

This structured approach ensures that all types of data are systematically organized, making it easier for users to locate and utilize the necessary datasets for their GIS projects.

2.3.2. APRX Folder

The **APRX** folder in Level 1 is dedicated to storing project files specific to ArcGIS Pro. This folder is organized into several discipline/category-based subfolders to ensure efficient management and accessibility of APRX files. Each subfolder corresponds to a specific area of focus within the project, allowing users to quickly locate and utilize the relevant ArcGIS Pro files. The Level 2 categories mentioned here are introduced as examples, and the SJTPO team can customize them according to their needs.

- **Engineering:** Contains APRX files related to engineering aspects of the project, including design, construction, and infrastructure analysis.
- **Environmental:** Stores APRX files focused on environmental studies, impact assessments, and ecological data.
- **Planning:** Includes APRX files used for urban and regional planning, land use analysis, and development strategies.
- **Right of Way:** Holds APRX files pertaining to right-of-way management, property acquisition, and legal documentation.

This structured approach ensures that all ArcGIS Pro project files are systematically organized by discipline, making it easier for users to access and work with the specific datasets relevant to their area of expertise.



2.3.3. MXD (ArcMap) Folder

The **MXD** folder in Level 1 is dedicated to storing project files specific to ArcMap. This folder is organized into several discipline/category-based subfolders to ensure efficient management and accessibility of MXD files. Each subfolder corresponds to a specific area of focus within the project, allowing users to quickly locate and utilize the relevant ArcMap files. The Level 2 categories mentioned here are introduced as examples, and the SJTPO team can customize them according to their needs.

- **Engineering:** Contains MXD files related to engineering aspects of the project, including design, construction, and infrastructure analysis.
- **Environmental:** Stores MXD files focused on environmental studies, impact assessments, and ecological data.
- **Planning:** Includes MXD files used for urban and regional planning, land use analysis, and development strategies.
- **Right of Way:** Holds MXD files pertaining to right-of-way management, property acquisition, and legal documentation.

This structured approach ensures that all ArcMap project files are systematically organized by discipline, making it easier for users to access and work with the specific datasets relevant to their area of expertise.

2.3.4. Documents Folder

The **Documents** folder in Level 1 is dedicated to storing important project documentation, reports, and reference materials. This folder is organized into several subfolders to ensure efficient management and accessibility of various types of documents. Each subfolder corresponds to a specific category of documentation, allowing users to quickly locate and utilize the relevant files. The Level 2 categories mentioned here are introduced as examples, and the SJTPO team can customize them according to their needs.

- **Logo:** Contains official logos and branding materials for the project.
- **Templates:** Stores document templates for reports, presentations, and other project-related documents.
- **Guidance:** Includes guidance documents, manuals, and instructions for various project processes and procedures.
- **Schema:** Holds schema definitions and data models used in the project.
- **Styles:** Contains style guides and specifications for maps, reports, and other visual materials.
- **QA:** Stores quality assurance documents, checklists, and reports to ensure data and process integrity.



This structured approach ensures that all project documentation is systematically organized by category, making it easier for users to access and work with specific documents relevant to their tasks.

2.3.5. Received Files Folder

The **Received Files** folder in Level 1 is dedicated to managing files that have been received from external parties. This folder is organized into several subfolders, each named based on the date, file format, and the name of the sender. This naming convention ensures efficient file storage and search, making it easy to locate and reference received files. In Level 2, for each received file, there will be a folder in "Received Files" named in the format: "**Date_FileFormat_Name**". The date should be captured in YYYYMMDD format. File format could be Email, CAD, KMZ, CSV, etc., and the name is captured as First Last format.

For example, if a CAD file was received from Sherry Shariat on March 4, 2025, the name of the subfolder in "Received Files" would be "**20250304_CAD_Sherry Shariat**".

This structured approach ensures that all received files are systematically organized, making it easier for users to access and work with the specific files relevant to their tasks.

2.3.6. Delivered Files Folder

The **Delivered Files** folder in Level 1 is dedicated to managing files that have been delivered to external parties. This folder is organized into several subfolders, each named based on the date, file format, and the name of the recipient. This naming convention ensures efficient file storage and search, making it easy to locate and reference delivered files. In Level 2, for each delivered file, there will be a folder in "Delivered Files" named in the format: "**Date_FileFormat_Name**". The date should be captured in YYYYMMDD format. File format could be Email, CAD, KMZ, CSV, etc., and the name is captured as First Last format.

For example, if a CAD file was delivered to Chris Bente on April 15, 2025, the name of the subfolder in "Delivered Files" would be "**20250415_CAD_Chris Bente**".

This structured approach ensures that all delivered files are systematically organized, making it easier for users to access and work with the specific files relevant to their tasks.

2.3.7. Archive Folder

The **Archive** folder in Level 1 is dedicated to storing historical data and previous versions of files for reference. Each subfolder in the Archive folder is named based on the date, project, file format, and detail. In Level 2, for each archived file, there will be a folder in "Archive" named in the format: "**Date_Project_FileFormat_Detail**". The date should be captured in



YYYYMMDD format. File format could be SHP, GDB, Raster, etc., and the project and detail provide specific context about the file.

For example, if a Shapefile (SHP) related to bike facilities in the Urbanized Area project was archived on April 15, 2025, the name of the subfolder in "Archive" would be "**20250415_UrbanizedArea_SHP_BikeFacilities**".

This structured approach ensures that all archived files are systematically organized, making it easier for users to access and retrieve historical data and previous versions of files for long-term use.

2.3.8. Temps Folder

The **Temps** folder in Level 1 is used for storing temporary files that are not yet finalized. This folder is organized to facilitate the management of files that are in progress or undergoing review. Temporary files may include drafts, intermediate versions, and working documents that are subject to change. Additionally, during GIS geoprocessing processes, some temporary files are created as part of the workflow. These files can also be saved in this folder. Once these files are finalized, they can be moved to their appropriate permanent locations within the project folder structure. This approach ensures that temporary files are kept separate from finalized data, reducing clutter and maintaining organization.

2.3.9. AGOL Folder

The AGOL folder in Level 1 is a key component of the hierarchical GIS folder structure, serving as the repository for all files and resources related to ArcGIS Online (AGOL). This folder is further organized into several Level 2 subfolders, each dedicated to specific aspects of AGOL, ensuring efficient management and accessibility of online GIS resources.

- **Web Services:** Contains files and configurations for web services published on AGOL, including feature services, map services, and other online resources that facilitate data sharing and visualization.
- **Survey123 Connect:** Stores forms, templates, and related files for Survey123 Connect, a tool used to create and manage surveys within the AGOL environment.
- **User Account Management:** Holds documentation related to the management of user accounts on AGOL, including user roles, permissions, and access controls.

This structured approach ensures that all AGOL-related resources are systematically organized, making it easier for users to locate and utilize the necessary files and configurations for their online GIS projects.

2.4. Level 3 Detail



The Level 3 folder structure is dedicated to organizing and managing exported files from GIS applications. This level ensures that all outputs are systematically categorized based on file types and formats, facilitating efficient file storage and search. The Level 3 categories mentioned here are introduced as examples, and the SJTPO team can customize them according to their needs.

- **Graphics:** Contains all exported graphic files, such as images, maps, and visual representations generated from GIS applications. This subfolder ensures that all graphical outputs are easily accessible for visualization and presentation purposes.
- **PDFs:** Stores all exported PDF files, including reports, maps, and documentation generated from GIS applications. This subfolder provides a centralized location for all PDF outputs, making it easy to locate and share these files.
- **Tables:** Holds all exported table files, such as CSVs, Excel spreadsheets, and other tabular data formats generated from GIS applications. This subfolder ensures that all tabular data is organized and readily available for analysis and reporting.

This structured approach enhances the organization and accessibility of exported files, ensuring that users can efficiently locate and utilize the appropriate outputs for their GIS projects.



3. GIS Standards and Requirements

3.1. Software Standard

To ensure compatibility and optimal performance, the South Jersey Transportation Planning Organization (SJTPO) is recommended to use the following minimum software versions for their ArcGIS platform:

- **ArcGIS Pro:** Version 3.4
- **ArcMap:** Version 10.8.2
- **ArcCatalog:** Version 10.8.2
- **ArcGIS Online (AGOL):** Always use the latest version available, as AGOL is a cloud-based platform that is continuously updated by Esri.

These versions will help SJTPO leverage the latest features and improvements in Esri's GIS software suite.

3.2. Coordinate System Standard

To ensure compatibility, accuracy, and optimal performance in GIS projects, the South Jersey Transportation Planning Organization (SJTPO) adheres to specific standards for projections, coordinate systems, horizontal datum, and vertical datum. These standards help maintain consistency and reliability across all GIS applications and datasets.

SJTPO employs coordinate systems that ensure precise location referencing:

- **New Jersey State Plane Coordinate System:** Divided into North and South zones, based on the North American Datum of 1983 (NAD83).
- **Universal Transverse Mercator (UTM):** UTM Zone 18N, based on NAD83.

3.2.1. Horizontal Datum

The horizontal datum used by SJTPO is:

- **North American Datum of 1983 (NAD83):** *This datum provides a consistent and accurate framework for spatial data across North America.*

3.2.2. Vertical Datum

For elevation data, SJTPO uses:

- **North American Vertical Datum of 1988 (NAVD88):** This datum ensures accurate elevation measurements and is widely used in the United States.



3.2.3. Projection

SJTPO utilizes several projections to accurately represent spatial data:

- **State Plane Coordinate System (SPCS):** Specifically, the New Jersey State Plane Coordinate System, divided into North and South zones, using the Transverse Mercator projection.
- **Universal Transverse Mercator (UTM):** UTM Zone 18N is suitable for the SJTPO region, providing accuracy over large areas.
- **Lambert Conformal Conic:** Often used for state-wide mapping, suitable for areas with a larger east-west extent.
- **Web Mercator:** Commonly used for web mapping applications, including ArcGIS Online (AGOL), useful for visualizing data on interactive maps.

3.3. Geodatabase Schema Requirements

A GIS geodatabase has a structural organization that determines how its data contents are related and accessed. This structure, also known as database schema, defines organizational constraints which should be considered carefully so as to not limit analysis and presentation of the data. The geodatabase contains both graphic (geographic coverages) and tabular data in a database schema (structure) designed to be easily understood and accessed by all team members for the duration of the project.

The geodatabase must be clearly organized, accessible and flexible for varying applications. This section describes the general hierarchy of a SJTPO geodatabase schema. Data stored in a geodatabase can be vector or raster data, (e.g., polygons or images) or tabular data (e.g., relatable tables). All data, regardless of file type, are organized in a hierarchical schema (organizational structure) as outlined below in Table 3-1:

Table 3-1: Database Hierarchical Schema

| File Type | Description |
|-------------|---|
| Geodatabase | <p>This is the highest level of the schema. Almost all GIS data can be contained within a geodatabase.</p> <p>At the geodatabase level attribute domain lists are maintained and defined. Attribute domains are rules that describe the valid values of a field type, providing a method for enforcing data integrity. Attribute domains are used to constrain the values allowed in any particular attribute for a table or feature class.</p> <p>If the features in a feature class or non-spatial objects in a table have been grouped into subtypes, different attribute domains can be assigned to each of the subtypes. A domain is a declaration of acceptable attribute values. Whenever a domain is associated with an attribute field, only the values within that domain are valid for the field. In other words, the field will not accept a value that is not in that domain. Using domains helps ensure data integrity by limiting the choice of values for a particular field.</p> |



| | |
|------------------|--|
| Feature Datasets | Feature Datasets are the broad groups of related data within which any number of environmental, planning, or engineering datasets, such as Biology, Land Use, or ROW are categorized. Feature classes found within each feature dataset are related to the parent feature dataset in which they reside. |
| Feature Classes | A Feature Class is a collection of geographic features with the same geometry type (such as point, line, polygon), the same attributes and the same spatial reference. Feature classes allow homogeneous features to be grouped into a single unit for data storage purposes. For example, highways, primary roads and secondary roads can be grouped into a line feature class named “roads.” In a geodatabase, feature classes can also store annotation and dimensions. |
| Fields | A Field is a column in a table that stores the attribute values. |
| Attributes | Attributes are non-spatial descriptive characteristics of the entity and contain information about a geographic feature in a GIS, usually stored in a table and linked to the feature by a unique identifier. For example, attributes of a river might include its name, length and sediment load at a gauging station. |

3.4. Meta Data Standard

The South Jersey Transportation Planning Organization (SJTPO) adheres to the Federal Geographic Data Committee (FGDC) metadata standards for all GIS data products, including both raster and vector formats. All GIS products created or otherwise prepared for the SJTPO shall include relevant metadata. The elements listed below cover the SJTPO minimum requirement for metadata. Additional metadata elements should be included in GIS datasets as necessary and appropriate. See Metadata Template in Table 3-2 below for more detailed information.

Table 3-2: Metadata Items Description

| Metadata Type | Field Name | Description |
|---------------------|----------------------------|--|
| Item Description | Title | Provide a descriptive title that uniquely identifies the dataset. |
| | Topics and Tags | (Optional) Keywords |
| | Summary | A brief narrative summary of the data set. |
| | Purpose | Briefly describe why the dataset was created. |
| | Description | Briefly describe what the dataset is about (who, what, where, when). Include any limitations of the dataset, assumptions made, and if there is anything special of which the user of these data should be aware. |
| | Date | The date or range of dates when the data, photos, maps, or other items at the core of the dataset were gathered or created. |
| | Credits | Provide recognition of those who created or contributed to the resource. If not specified, use “South Jersey Transportation Planning Organization” for all data that was created by SJTPO. |
| Contact Information | Individual or organization | Name: |
| | | Organization: |



| Metadata Type | Field Name | Description |
|--------------------------------|---|---|
| | knowledgeable about the dataset | Unit, program, group: |
| | | Email: |
| | | Address: (Optional) City, State, Postal Code |
| | | Phone Number: Include area code |
| Data Quality | Scope level description | Describe the specific data to which the data quality information applies. For example, the features in a dataset may be derived from different sources with different dates, scales, and levels of accuracy. |
| | Lineage | Lineage is often a useful indicator of data accuracy. It is a record of the data sources and of the operations which created the database. How was it digitized, and from what documents? When was the data collected? What agency collected the data? What steps were used to process the data? What is the computational precision? |
| | Progress | Possible values are Complete or Incomplete. If incomplete, include the percent completed and the expected date of data completion, if known. |
| Update Frequency (Maintenance) | Maintenance Frequency | Possible values include but are not limited to: Continually, Daily, Weekly, Monthly, Annually, Unknown, As Needed, Irregular, or None Planned. |
| Distribution | Defined Distribution Constraints | Designate the location of the data. |
| | | If the data is distributed as a web service or end point, provide the URL or link to the service. |
| | | Provide the name of the data format version and distributor information. For example, <i>ArcGIS 9.3, 10.1</i> . |
| Projection and Datum | Projection | Provide the name of the Projected Coordinate System. |
| | Units | Metric (Meters, Kilometers, etc.) or English (Feet, Miles, etc.) |
| | Datum | Provide the Datum in which the data is the projected. (NAD83 is preferred) |
| | Data Format | Vector or Raster (Image) data |
| Definitions | Field and Attribute or Domain Definitions | List and define each field in the attribute table and the definition's source. Also include the domain and domain type allowed in each field. |
| | Abbreviation and Code Definitions | For any field or record that contains numeric or alphabetic codes, list each code/abbreviation and provide an unabbreviated definition. |
| | General Constraints | Identify who may see, read, or use the data. If there are no restrictions, put "None." |



| Metadata Type | Field Name | Description |
|--|----------------------|--|
| Data Sharing / Access/ Use Constraints | Legal Constraints | Identify any restrictions, limitations or warnings on using the resource or metadata: for example, to assure the protection of privacy or intellectual property. If not, put "None." |
| | Security Constraints | Identify any handling restrictions of the data or metadata. If not, put "None." |
| Disclaimers | External Disclaimer | SJTPO external disclaimer should be included in the metadata for any GIS data we send out of the SJTPO. |
| | Internal Disclaimer | SJTPO internal disclaimer should be included in the metadata for any GIS products. |
| | Use Limitations | SJTPO Use Limitation Policy should be included in the metadata for any GIS data we send out of the SJTPO. |

All received data from consultants or other internal teams should contain the required metadata. If the metadata is not included, it should be asked for and documented later.

4. QUALITY CONTROL

A *Quality Control (QC)* review process is required when underlying data, schema, analytics, cartographic products, and/or any web viewing applications which are directly affected by the graphical representation of the data, have been altered or modified. The entire QC process from beginning to end must be enacted and signed off on before migrating to the live Production environment.

GIS data audits should be conducted at least twice a year on a regularly scheduled rotation to help assist with substantiating and solidifying the quality of the data in a more consistent fashion. Data audits should always involve a *Subject Matter Expert (SME)* to review the quality as well. In addition, a GIS team member should also be included, internally, before the changes are sent to a SME or to the requestor for their review. The data editor or map author should review their own work, along with another GIS team member for a further round of review.

4.1. QC Processes

A comprehensive QC review process is essential to ensure the accuracy and reliability of GIS data. The following requirements must be met for every GIS audit:

Audit Frequency:

- Perform audits biannually (twice a year).

Audit Scope:

- Include a 10% random sample of feature class-related vector and raster data, including geometry, attributes, and domains maintained within geodatabases (FGDB).
- Include a 10% random sample of all cartographic mapping data files (APRX and MXD) and output deliverables stored within PDF or other industry-standard image file formats.
- Include a 10% random sample of all metadata and associated information.
- Include a 10% random sample of analytic report documents.
- Include a 10% random sample of all QC forms.

Audit Evaluation:

- Evaluate compliance of sampled items with the standards set out in this data management plan.

4.2. QC Standards

The following items listed in Table 4-1 should be considered during a QC review of GIS products:



Table 4-1: Cartography QC Items

| Item | Action |
|-------------------|---|
| Standard Layout | Ensure an appropriate layout template is used based on the mapping purpose. |
| Legend | Cross check legend items with existing features in the layout view. |
| Scale Bar | Check the scale bar on layout view for the right scale. |
| North Arrow | Check the north arrow on layout view for the right angle. |
| Layer Credits | Ensure layer credits are correct and up to date. |
| Symbology | Ensure symbology is correct, clear and matches the Legend. Background feature's symbology should be consistent among all segments and maps. |
| Attributes/Labels | Attributes and labels should be reviewed for missing or incorrect information. |
| Spelling | Spell check all texts including map title, header, footer, labels, and legend. |
| Font | Review all text fonts for consistency. |
| Coordinate System | Ensure appropriate coordinate system and projection is used. |
| Broken Links | Check all the layers for broken links. |
| Data Updates | Ensure all data sources are recent and the right version. |
| Location | At a minimum, a qualitative visual inspection of the data overlaid with reference data for relative comparison is required. |
| Metadata | The data should have metadata that meets the standard in Section 3.4 Meta Data Standard. |
| File Storage path | Ensure file path name exists and is correct. |
| Date | Ensure the date is correct and reflects the latest version. |

A GIS team member must review the updates and/or additions before delivering results back to the original requestor. The reviewer should use the standardized QC form provided in the QC Form Section below to document and sign off on the official QC review.



4.3. QC Form

GIS QC Form

| | |
|---------------------------|---------------------------|
| Editors Name: | Reviewer Name: |
| Date of Submittal: | Date of Review: |
| Signature: | Signature: |
| Date of Revision: | Date of Backcheck: |
| Signature: | Signature: |

| | |
|--|-----------------|
| File Name: | |
| File Path: | |
| <input type="checkbox"/> File Location Are the file and datasets saved in the correct location according to the Project Directory Structure? | Comment: |
| <input type="checkbox"/> Original Source Path If the data is based on a received source file, is the original source saved in the right location? | Comment: |
| <input type="checkbox"/> Data Version (Time Snapshot) If there is a live data in use, Is the referenced version of the data archived in the right location? | Comment: |
| <input type="checkbox"/> Projection Are the projection and coordinate system assigned correctly? | Comment: |
| <input type="checkbox"/> Metadata Is the metadata available for the data source and meets the minimum standards? | Comment: |
| <input type="checkbox"/> Attributes/Labels Are the attributes correct, and spot checked against source information? Are Labels visible and showing correct information? | Comment: |
| <input type="checkbox"/> Layout Does the layout match the SJTPO standard layout template? | Comment: |
| <input type="checkbox"/> Legend Are legend items matched with existing features in the layout view? | Comment: |
| <input type="checkbox"/> Symbology Is symbology correct and matched with the legend? | Comment: |
| <input type="checkbox"/> Scale Bar/North Arrow Are Scale Bar and North Arrow showing the right information on the layout? | Comment: |
| <input type="checkbox"/> Spelling Are all texts in title, header, footer, labels, and legend, correct? | Comment: |



Other Observations/Comments:



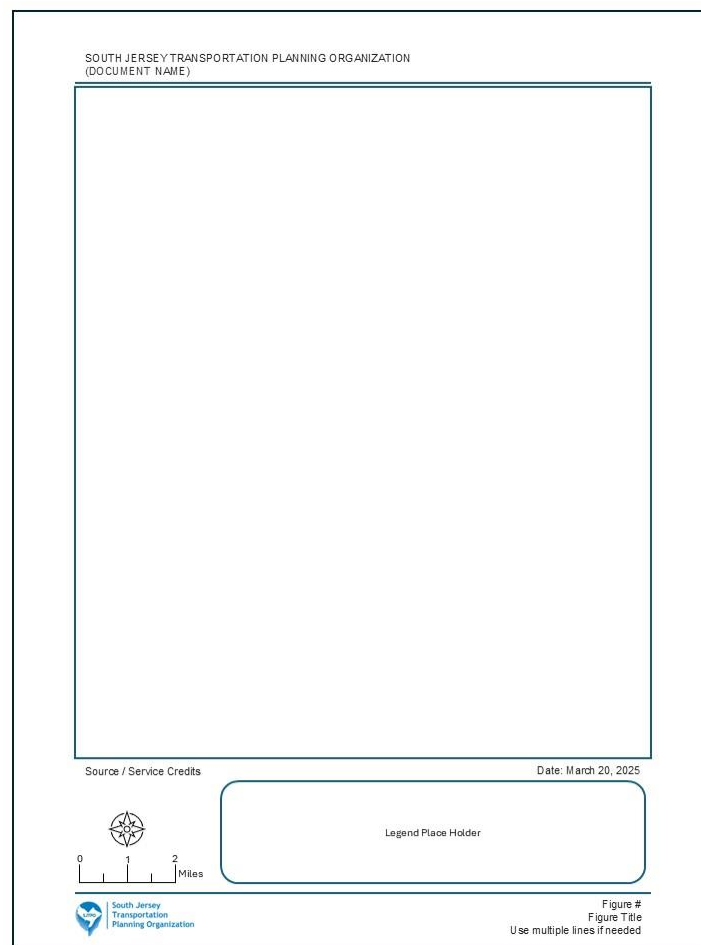
5. LAYOUT TEMPLATES

This section provides various layout templates for different page sizes and orientations to ensure consistency and standardization in the presentation of GIS data and maps. The templates include:

- **Layout_8X11_Portrait:** A template for standard letter-sized portrait layouts.
- **Layout_11X17_Portrait:** A template for tabloid-sized portrait layouts.
- **Layout_11X8_Landscape:** A template for letter-sized landscape layouts.
- **Layout_17X11_Landscape:** A template for tabloid-sized landscape layouts.

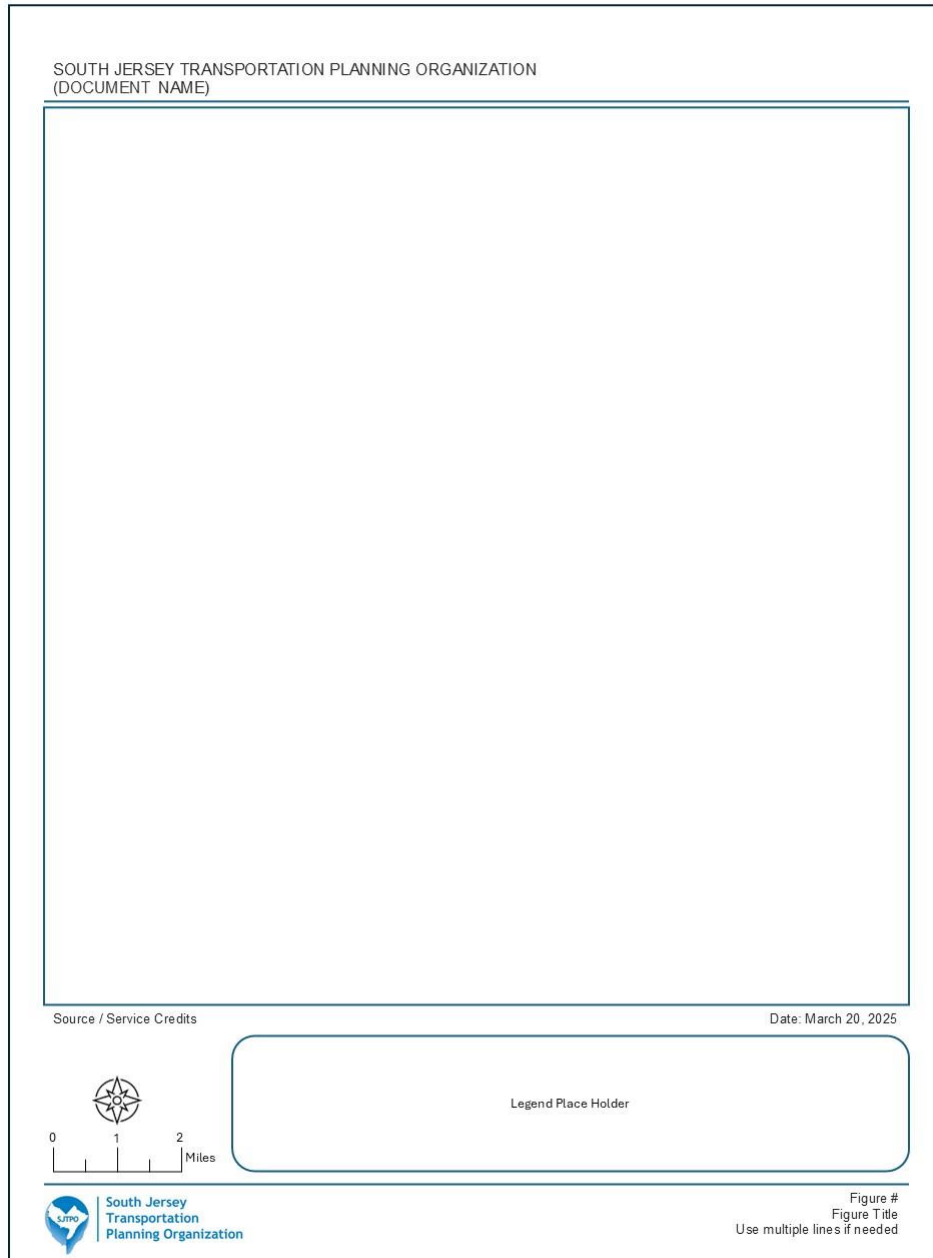
These illustrations represent the proposed templates. The actual templates can be customized in collaboration with the SJTPO team based on their specific requirements and delivered in APRX format. Each template is designed to meet project needs and ensure that all GIS outputs are visually consistent and professionally formatted.

5.1. Layout_8X11_Portrait



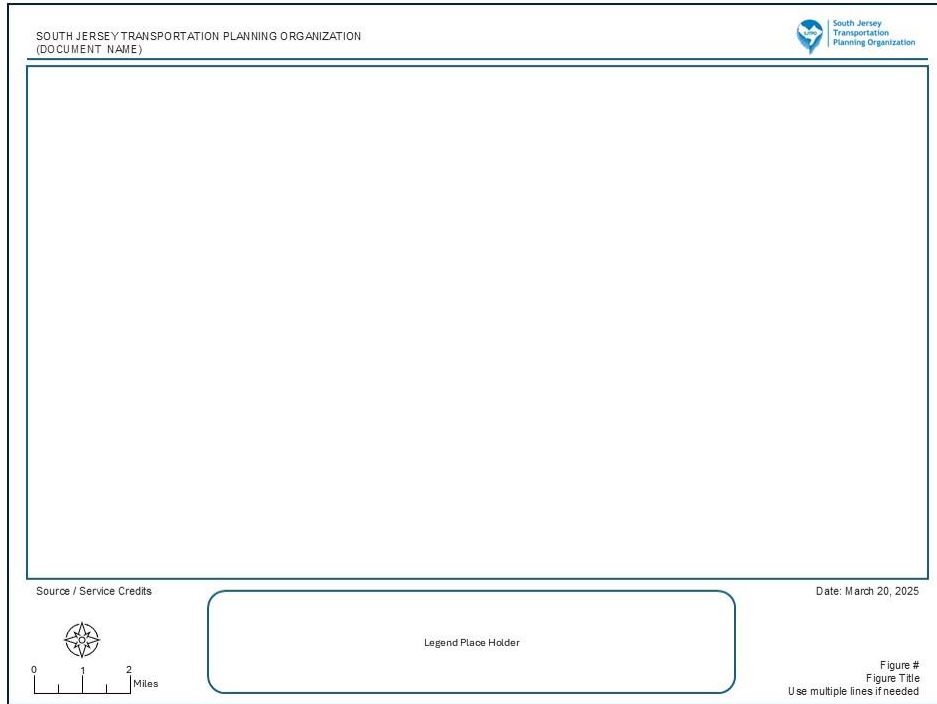


5.1. Layout_11X17_Portrait



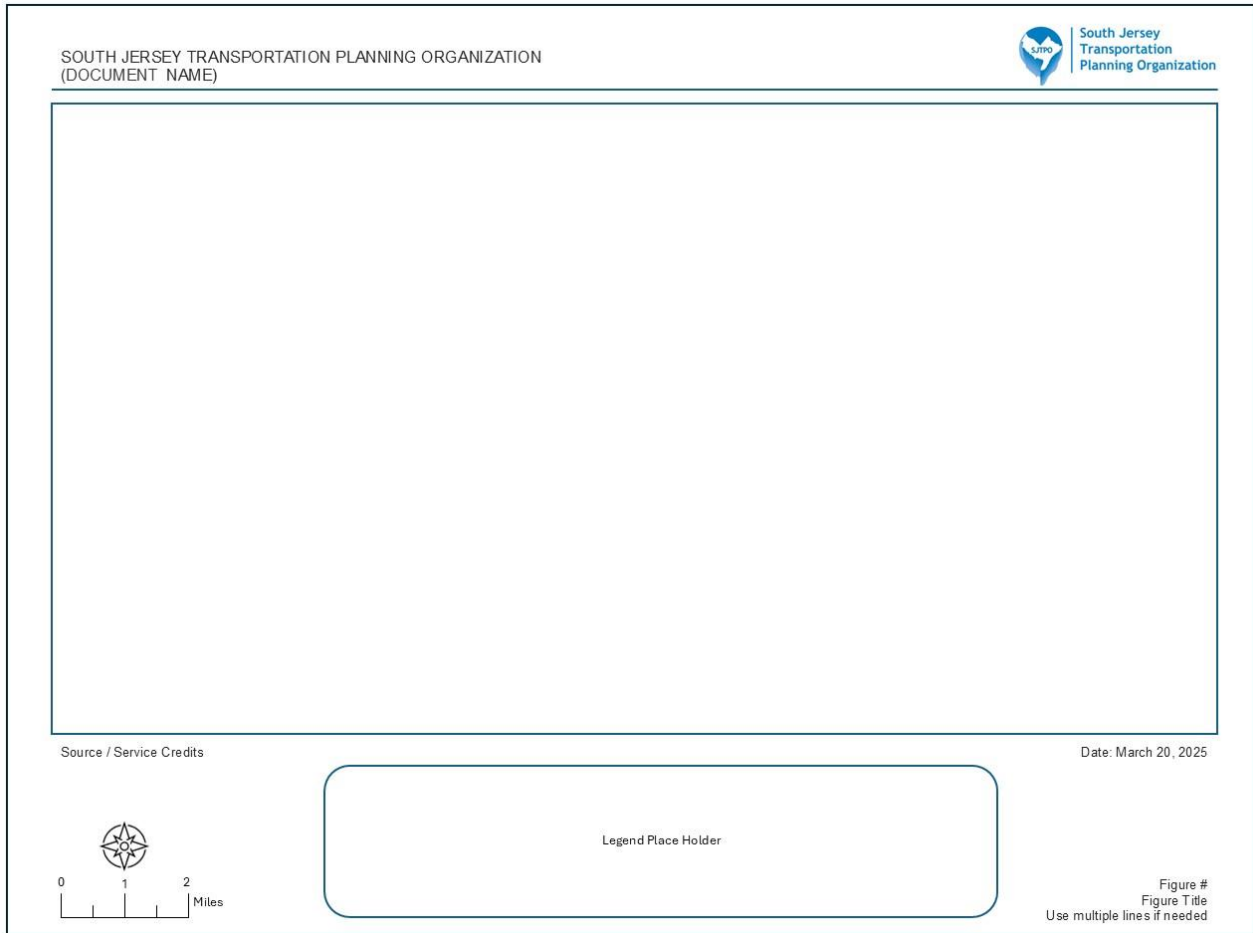


5.2. Layout_11X8_Landscape





5.3. Layout_17X11_Landscape





6. ArcGIS Online (AGOL) Management

6.1. Overview

ArcGIS Online (AGOL) is a cloud-based platform that allows users to create, share, and manage geographic information system (GIS) content. This section provides guidelines for effectively working with and managing items in AGOL to ensure data integrity, accessibility, and collaboration.

6.2. Creating and Publishing Content

- **Feature Services:** Use ArcGIS Pro to publish feature services to AGOL. Create a dedicated folder and a corresponding group for each project. Publish the feature layer or web map from ArcGIS Pro to the related folder in AGOL and then share the published item with the corresponding group.
- **Hosted Layers:** Use ArcGIS Pro to publish hosted layers for data that needs to be accessible (or downloadable) online. Ensure that hosted layers are regularly updated and maintained.
- **Web Maps and Web Apps:** Use AGOL platform to create interactive web maps and web applications. Ensure that all maps and apps are properly configured with relevant layers, symbology, and settings.

6.3. Managing Items

- **Item Details:** Provide comprehensive item details, including title, summary, description, tags, and credits. This information helps users understand the content and its purpose.
- **Metadata:** Ensure that all items have complete and accurate metadata. Follow the metadata standards outlined in Section 3.4 to maintain consistency.
- **Sharing Settings:** Configure sharing settings to control access to items. Use groups to manage access for specific user groups and ensure that sensitive data is only accessible to authorized users.
- **Versioning:** Maintain version control for items to track changes and updates. Use item history and snapshots to manage different versions of data.

6.4. Collaboration and User Management



- **Groups:** Create and manage groups to facilitate collaboration among team members. Use groups to share content, manage access, and organize projects.
- **User Roles:** Assign appropriate user roles and permissions based on the responsibilities of team members. Ensure that users have the necessary permissions to perform their tasks without compromising data security.

6.5. Data Quality and Security

- **Data Quality:** Regularly review and update data to ensure accuracy and relevance. Use AGOL's data quality tools to identify and correct errors.
- **Performance Optimization:** Optimize the performance of web maps and applications by using efficient data structures, reducing the number of layers, and leveraging AGOL's caching capabilities.
- **Backup and Recovery:** Implement a backup and recovery plan to protect data from loss or corruption. Regularly back up critical data and maintain copies in a secure location.
- **Data Security:** Implement security measures to protect data from unauthorized access and breaches. Use AGOL's security features, such as access controls, to safeguard data.

6.6. Workflow

To ensure a streamlined process for publishing and managing content in AGOL, follow these steps:

6.6.1. Step 1: Preparing Layers in ArcGIS Pro

- **Create and Configure Layers:** Prepare your GIS layers in ArcGIS Pro, ensuring that all data is accurate and properly configured.
- **Set Symbology and Attributes:** Define symbology, attributes, and metadata for each layer to ensure consistency and clarity.

6.6.2. Step 2: Publishing Feature Services to AGOL

- **Create a Folder and Group:** In AGOL, create a dedicated folder for the project and a corresponding group to manage access.
- **Publish from ArcGIS Pro:** Use ArcGIS Pro to publish the feature layer or web map to the related folder in AGOL. Ensure that the publishing settings are configured correctly.



- **Share with Group:** After publishing, share the item with the corresponding group to control access and collaboration.

6.6.3. Step 3: Creating a Web Map in AGOL

- **Add Published Layers:** In AGOL, create a new web map and add the published layers to it. Configure the map settings, including symbology, pop-ups, and labels.
- **Save and Share:** Save the web map and share it with the relevant group to ensure accessibility.

6.6.4. Step 4: Creating a Web App or Dashboard

- **Select Template:** Choose a web app or dashboard template in AGOL that suits your project's needs.
- **Configure App:** Use the web map created in Step 3 to configure the web app or dashboard. Customize the layout, widgets, and settings to enhance functionality.
- **Publish and Share:** Publish the web app or dashboard and share it with the relevant group to facilitate collaboration and data visualization.

7. Styles and Symbolology

Effective cartographic representation is critical to conveying geospatial information accurately and comprehensibly. The South Jersey Transportation Planning Organization (SJTPO) employs a comprehensive suite of point, line, polygon, and text symbols to ensure clarity, consistency, and relevance across GIS outputs. These styles and symbolologies, crafted in ArcGIS Pro, form an integral part of SJTPO's geospatial data visualization standards.

These symbols have been organized within an ArcGIS Pro template file, which allows users to easily reference and incorporate them into their projects. This template ensures consistency and facilitates efficient application of standardized styles. Figure 7-1 illustrates the symbols under the SJTPO style section, showcasing their organization and design.

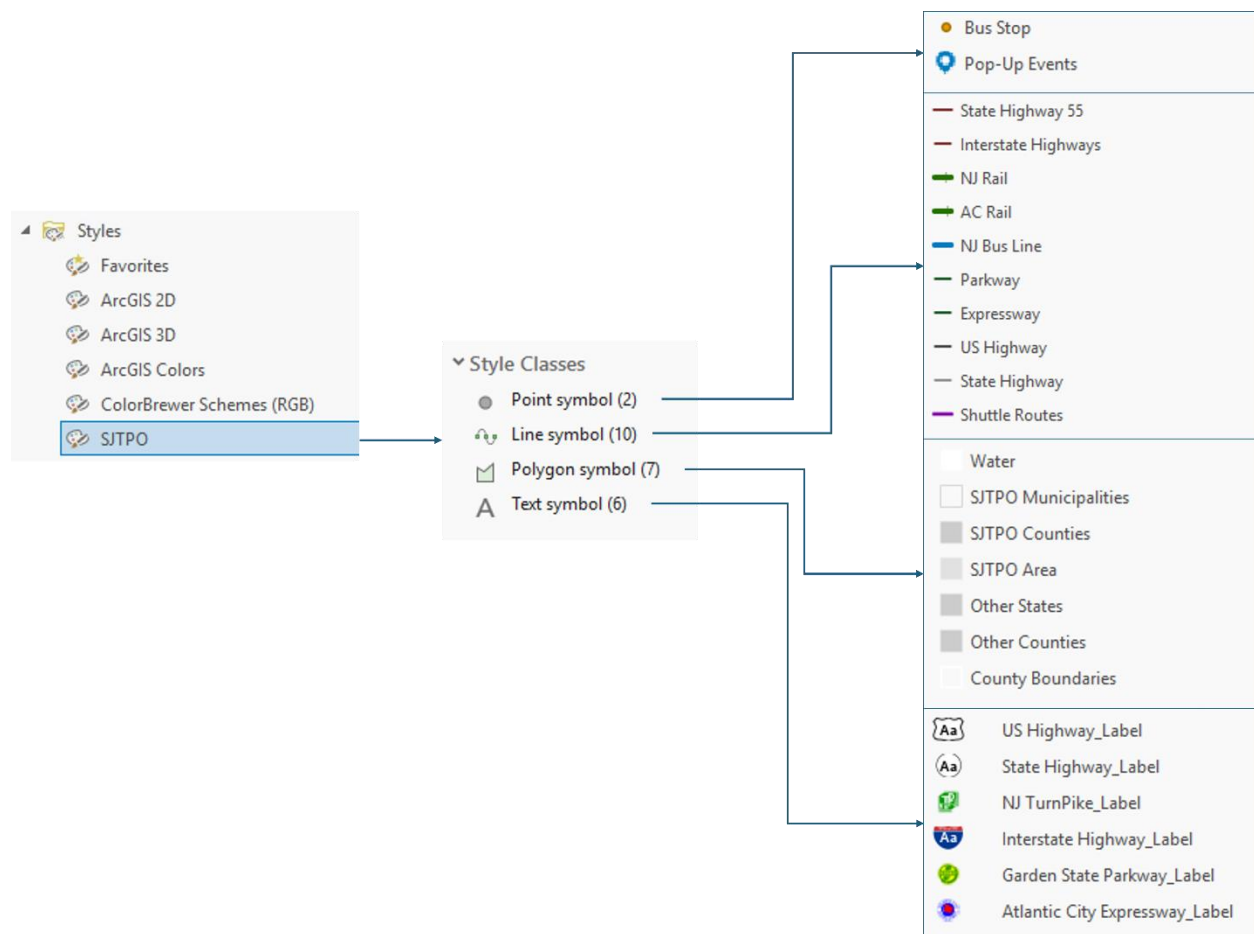


Figure 7-1: SJTPO Styles

7.1. Point Symbols

Point symbols are designed to represent specific locations and features of interest. Examples include:

- **Bus Stops:** Indicating public transportation hubs within the SJTPO region.
- **Pop-Up Events:** Highlighting temporary or mobile events.

These point symbols are easily distinguishable, aiding map readers in identifying key locations at a glance.

7.2. Line Symbols

Line symbols provide visual representation for linear features, categorized for clear differentiation:

- **Transportation Networks:** Including State Highways, Interstate Highways, U.S. Highways, Expressways, Parkways, and the Garden State Parkway.
- **Rail Systems:** Atlantic City Rail and NJ Rail lines.
- **NJ Bus Lines:** Representing New Jersey regional bus routes.

Distinct symbology ensures transportation corridors and connections are easily interpretable for planning and analysis purposes.

7.3. Polygon Styles

Polygon styles are utilized for area-based features, enabling comprehensive regional assessments:

- **Administrative Boundaries:** SJTPO Municipalities, Counties, and the overarching SJTPO Area.
- **Adjacent Areas:** Other states, counties, and respective boundaries.
- **Natural Features:** Including water bodies and other geospatially significant areas.

These polygon styles aid in spatial comparison, boundary delineation, and thematic mapping.

7.4. Text Symbols

Text symbols add a critical layer of labeling and annotation to maps, enhancing their informational value:

- **Transportation Labels:** Including U.S. Highway, State Highway, NJ Turnpike, Interstate Highway, Garden State Parkway, and Atlantic City Expressway labels.

These text styles ensure map readability and provide important contextual information, particularly for navigation and transportation planning.

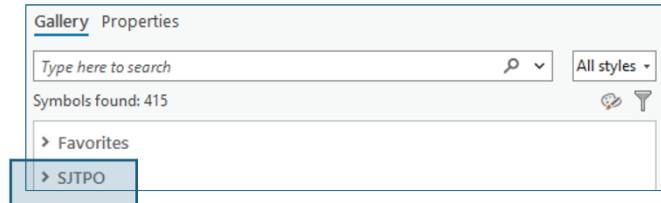
Integration and Standards

Symbologies adhere to cartographic and organizational standards, ensuring consistent visual representation across projects. All styles and symbology templates are stored within ArcGIS Pro,

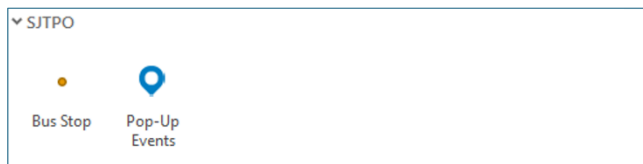
enabling seamless reuse and adaptation for future projects. Figure 7-2 illustrate snapshots of the symbols and styles accessible under the SJTPO Style Gallery.

By maintaining a robust library of styles and symbologies, efficient map production is supported, and clear communication of geospatial data is facilitated.

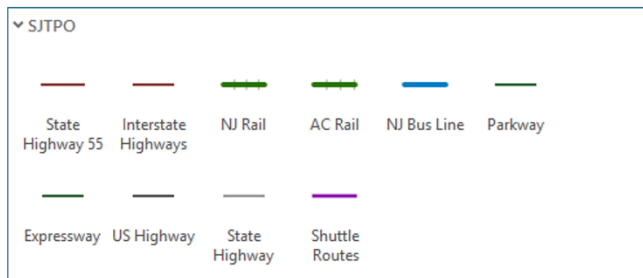
SJTPO Symbols Gallery



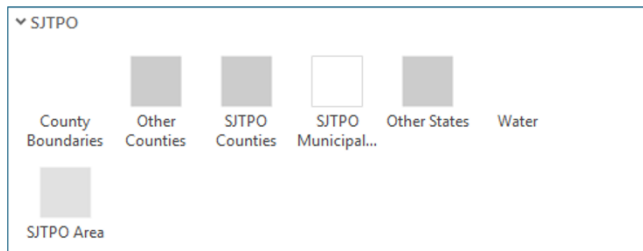
SJTPO Point Symbols



SJTPO Line Symbols



SJTPO Polygon Symbols



SJTPO Text Symbols

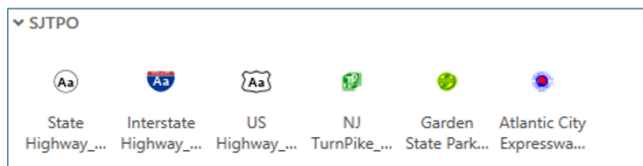


Figure 7-2: SJTPO Style Gallery



8. Authoritative Resources

SJTPO leverages publicly accessible GIS data to enhance spatial analysis, mapping, and transportation planning efforts. To streamline access to these datasets, this section provides a curated list of open data portals and GIS service URLs from relevant agencies. These resources allow SJTPO to directly connect to authoritative datasets within ArcGIS Pro via GIS Server Connections, facilitating efficient data integration and analysis.

8.1. Open Data Portals

Below are key open data portals from agencies providing publicly available geospatial datasets:

8.1.1. National level

1. United States Department of Transportation:
 - Web Page (Open Data Catalog): <https://data-usdot.opendata.arcgis.com/>
 - Webpage (Maps and Apps): <https://www.bts.gov/maps>
2. FEMA Flood Map Service Center:
 - Web Page: <https://msc.fema.gov/portal/home>
3. National Oceanic and Atmospheric Administration, NOAA Digital Coast Data:
 - Web Page: <https://coast.noaa.gov/digitalcoast/data/home.html>
4. United States Federal Highway Administration, FHWA HEPGIS website:
 - Web Page: <https://hepgis-usdot.hub.arcgis.com/>
5. United States Census Bureau, Data:
 - Web Page: <https://www.census.gov/data.html>

8.1.2. State Level

1. New Jersey GIS Information Network Open Data Portal:
 - Web Page: [NJGIN Open Data](#)



2. New Jersey Department of Environmental Protection, Bureau of GIS:
 - Web Page: [NJDEP Open Data](#)

3. New Jersey Department of Environmental Protection, GeoWeb Application:
 - Web Page: [NJ-GeoWeb](#)

4. New Jersey Department of Transportation, GIS Data:
 - Web Page: <https://nj.gov/transportation/refdata/gis/data.shtm>

5. New Jersey Office of GIS:
 - Web Page: [NJ Office of GIS](#)

6. North Jersey Transportation Planning Authority (NJTPA), GIS & Data Resources:
 - Web Page: <https://share-open-data-njtpa.hub.arcgis.com>

7. New Jersey, Cross County Connection TMA:
 - Web Page: <https://driveless.com/local-government-programs-services/bicycle-pedestrian-planning-and-safety/>

8. Delaware Valley Regional Planning Commission, GIS Data and Maps:
 - Web Page: <https://www.dvrpc.org/mapping>

9. New Jersey, Atlantic County:
 - Web Page: <https://www.acnj.gov/Departments/planning-and-development>

10. New Jersey, Cape May County:
 - Web Page: <https://capemaycountynj.gov/806/Mapping-Service>

11. New Jersey, Cumberland County:
 - Web Page: <https://www.cumberlandcountynj.gov/GIS>

12. New Jersey, Salem County:
 - Web Page: <https://www.salemcountynj.gov/>



13. New Jersey, City of Vineland:

- Web Page: <https://www.vinelandcity.org/gis-maps/>

14. New Jersey, Atlantic City:

- Web Page: <https://cityofatlanticcity.org/>

These portals provide diverse datasets relevant to environmental studies, transportation planning, and general GIS applications. Users can browse, download, and utilize these datasets within SJTPO's workflow.

8.2. GIS Server Connections

SJTPO has established GIS Server Connections within ArcGIS Pro to facilitate seamless data access from authoritative GIS services. The following GIS services URLs have been integrated within the APRX template created for SJTPO, enabling direct access to live spatial datasets:

8.2.1. National level

National Oceanic and Atmospheric Administration (NOAA) Servers:

N1. Bathymetry, Space Weather, Geophysics (NCEI-CO)

- Server Connection: <https://gis.ngdc.noaa.gov/arcgis/rest/services>

N2. Weather and Climate (NCEI-NC)

- Server Connection: <https://gis.ncdc.noaa.gov/arcgis/rest/services>

Federal Emergency Management Agency (FEMA) Servers:

N3. Disaster Response and Recovery

- Server Connection: <https://gis.fema.gov/arcgis/rest/services>

N4. Hazard Mapping and Risk Assessment

- Server Connection: <https://hazards.fema.gov/arcgis/rest/services>

United States Federal Highway Administration (FHWA) Servers (Same as USDOT):



N5. National Transportation Infrastructure and Planning

- Server Connection: <https://services.arcgis.com/xOi1kZaI0eWDREZv/ArcGIS/rest/services>

US Census, Topologically Integrated Geographic Encoding and Referencing (TIGER) Servers:

N6. Geospatial Census Data and Boundary Mapping

- Server Connection: <https://tigerweb.geo.census.gov/arcgis/rest/services>

United States Department of Transportation (USDOT) Servers:

N7. Nationwide Transportation Networks and Analysis

- Server Connection: <https://services.arcgis.com/xOi1kZaI0eWDREZv/ArcGIS/rest/services>

8.2.1. State Level

New Jersey GIS Information Network (NJGIN) Servers:

S1. NJ Department of Community Affairs

- Server Connection: <https://services.arcgis.com/Aur8tCo478N3VovT/ArcGIS/rest/services>

S2. New Jersey Department of State, Office for Planning Advocacy

- Server Connection: <https://services3.arcgis.com/iy3mGBSHxkFa1uPL/ArcGIS/rest/services>

S3. New Jersey Office of GIS

- Server Connection: <https://services2.arcgis.com/XVOqAjTOJ5P6ngMu/ArcGIS/rest/services>

S4. New Jersey Department of Transportation

- Server Connection: <https://services.arcgis.com/HggmsDF7UJsNN1FK/ArcGIS/rest/services>

S5. New Jersey State Agriculture Development Committee

- Server Connection: <https://services.arcgis.com/gzSkSfQGxyX6dicF/ArcGIS/rest/services>

S6. NJ Transit GIS Department

- Server Connection: <https://services6.arcgis.com/M0t0HPE53pFK525U/ArcGIS/rest/services>



S7. New Jersey Highlands Council

- Server Connection: <https://services6.arcgis.com/ZrVIS0wslq8Nvq5I/ArcGIS/rest/services>

S8. New Jersey Pinelands Commission

- Server Connection: <https://services1.arcgis.com/nCm6SZaiGMuGX35I/ArcGIS/rest/services>

S9. Atlantic County Office of GIS

- Server Connection: <https://services1.arcgis.com/z18KTAVDZDXq9ZmQ/ArcGIS/rest/services>

S10. New Jersey, County of Burlington

- Server Connection: <https://gisportal.co.burlington.nj.us/hosting/rest/services>

S11. New Jersey, Middlesex County

- Server Connection: <https://services.arcgis.com/BnY3izA2Kwu6jVHq/ArcGIS/rest/services>

S12. New Jersey, Monmouth County

- Server Connection: <https://services1.arcgis.com/PsDtSYIjNsyfjwcX/ArcGIS/rest/services>

S13. New Jersey, Somerset County Office of GIS Services

- Server Connection: <https://services2.arcgis.com/2g2XvfUywwLJoF2c/ArcGIS/rest/services>

S14. New Jersey, County of Sussex

- Server Connection: <https://services.arcgis.com/opPd2BqYeMe7vELn/ArcGIS/rest/services>

S15. Delaware Valley Regional Planning Commission

- Server Connection: <https://services1.arcgis.com/LWtWv6q6BJyKidj8/ArcGIS/rest/services>

S16. US Census Bureau

- Server Connection: <https://services.arcgis.com/P3ePLMYs2RVChkXj/ArcGIS/rest/services>

New Jersey Department of Environmental Protection (NJDEP) Servers:

- S17. Cadastral, Elevation, Government, Land, Transportation, Utilities data:



- Server Connection: <https://services1.arcgis.com/QWdNfRs7lkPq4g4Q/ArcGIS/rest/services>

S18. Environmental, Geology, Grids, Hydrology, Structure data:

- Server Connection: <https://mapsdep.nj.gov/arcgis/rest/services>

New Jersey Climate Change Resource Center (NJ ADAPT) Servers:

S19. Climate Adaptation and Environmental Resilience

- Server Connection: <https://services1.arcgis.com/ze0XBzU1FXj94DJq/ArcGIS/rest/services>

New Jersey, Cumberland County Servers:

S20. Countywide GIS Data and Land Management

- Server Connection: <https://services3.arcgis.com/n57TaxATizczF7nd/ArcGIS/rest/services>

New Jersey, City of Vineland Servers:

S21. Municipal GIS Services and Community Planning

- Server Connection: <https://gisportal.vinelandcity.org/arcgis/rest/services>

These connections enable SJTPO to dynamically access and utilize authoritative GIS data for various applications within ArcGIS Pro, ensuring up-to-date spatial analysis and decision-making support.

By maintaining these connections and leveraging publicly available data sources, SJTPO enhances data accessibility and operational efficiency while integrating regional and state-wide datasets into its planning framework.