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Greenville Utilities

RFP 25-21

Esri Utility Network Design Services

May 12th, 2025

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Cleve Haddock, Procurement Manager
Greenville Utilities Commission
Purchasing Department
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(252) 551-1533

May 13, 2025

RE: Request for Proposal #25-21 for Esri Utility Network Design Services

Dear Selection Committee,

Cultivate Geospatial Solutions (CGS) appreciates the opportunity to respond to the Greenville Utilities Commission's Request for Proposal for Esri Utility Network Design Services. CGS is a specialized boutique GIS firm recognized for its deep expertise in Enterprise GIS, asset management, and data-driven strategic planning for government utility clients. **As a Gold Esri Business Partner**, CGS has extensive experience designing, implementing, and managing GIS programs that maximize the value of spatial data across organizations.

Our expertise includes developing and **optimizing Utility Networks to support critical infrastructure needs, enhance spatial analysis, and improve data-driven decision-making for utility agencies**. CGS has successfully configured, implemented, and maintained Esri's Utility Network framework for similar clients, ensuring seamless integration of utility asset data, network connectivity modeling, and advanced spatial analytics. We understand the complexities of transitioning legacy systems into modern, scalable GIS architectures that align with enterprise-wide digital transformation goals.

In addition to our Utility Network expertise, CGS has hands-on experience managing daily GIS program operations and working closely with stakeholders to develop sustainable and scalable Enterprise GIS strategies that benefit all departments. Our team excels at aligning GIS applications with business processes, modernizing data infrastructure, and ensuring long-term usability and growth. **For this project, CGS has partnered with 1Spatial, a global leader in providing exceptional Utility Network database tools**. 1Spatial brings extensive experience serving municipal utilities and has been instrumental in providing design services and asset management solutions tailored to those agency's needs. Together, our team offers decades of combined experience in GIS-driven Data Strategy and Asset Management.

On behalf of CGS, we look forward to the opportunity to partner with Greenville Utilities Commission on this important project. If you have any questions or concerns, please do not hesitate to contact me directly. I am the primary contact and the Proposed Project Manager for the firm and the individual to whom correspondence should be directed. I can be reached at dlynch@cultivategeospatial.com; my direct phone is 513-600-1316; and my address is 3500 Depauw Blvd, Suite 10815, Indianapolis, IN 46268. I look forward to hearing from you regarding the next steps.

Sincerely,

Douglas Lynch, GISP
Principal, Owner

Company Background and Relevant Experience

We have assembled a highly skilled and experienced team to support this project, led by industry leader Cultivate Geospatial Solutions (CGS). CGS brings unmatched expertise in GIS implementation and Utility Network migration, ensuring the project is guided by proven best practices and deep technical knowledge. Supporting CGS is our trusted partner, 1Spatial, whose advanced data validation tools significantly enhance the migration process by identifying and resolving issues that commonly hinder Utility Network adoption. These tools complement native ArcGIS capabilities, increasing efficiency and reducing the time and effort required to prepare data for a successful transition.

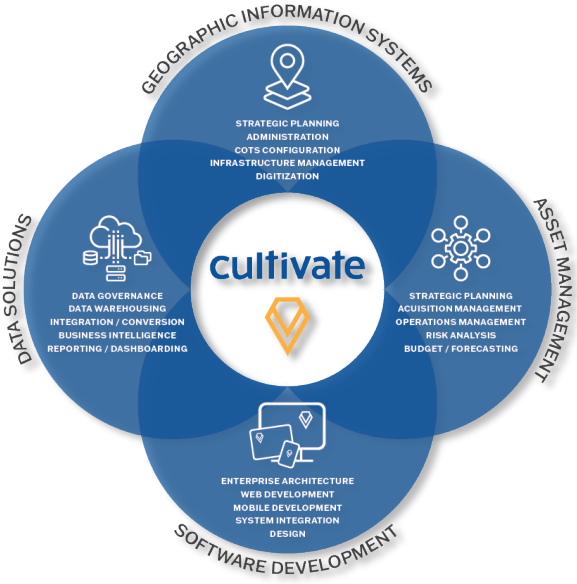
A) Company Overview

Cultivate Geospatial Solutions (CGS) is a public sector-focused data solutions, data analytics, geographic information system (GIS), and enterprise software development powerhouse company. CGS excels at providing our clients with innovative data, GIS, and asset management solutions**. Assessments, strategies, and implementation of enterprise GIS programs are a hallmark of the CGS team.** We specialize in creating custom and COTS-enabled GIS solutions, interactive websites, and web-based applications to meet increasing demands for agency operations, decision-makers, and mobile field workers. Headquartered in Indianapolis, Indiana our team of professionals are strategically located throughout the US.

We are experts in Enterprise Data Solutions and how they can and should be tactically organized for success across all Agency Departments. Our team has over 200 years combined experience working in GIS, **with over 75 years in GIS Data Governance and Asset Data Lifecycle solutions.**

The CGS team's services have evolved in alignment with the Geospatial, Data Solutions, and Asset Management industries. **At a high level, the team offers the following key GIS services: Strategic Planning, Administration, COTS (configurable off the shelf) Software Configuration, Geospatial Infrastructure Management, Enterprise Architecture Mobile Development, System Integration, Utility Network database design and implementation, and Web and Database applications development. CGS has many years of experience designing and building award-winning COTS-based and custom GIS solutions tailored to meet client needs.**

CGS has selectively chosen companies with which to partner, looking for those that provide state-of-the-art platforms that enable our team to provide our customers with efficient, cutting-edge solutions. The beneficial partnerships to this project include Esri, Qlik, and Safe Software. They all provide unique technology



Cultivating Infrastructure Leadership through GIS, AM, and Data Intelligence Software Solutions.

that allows us to provide solutions tailored to the GIS data life cycle. For instance, Qlik provides tools that enable data governance, cataloging and other data standards/quality capabilities.

CGS has a deep and close relationship with Esri. These relationships have been built over 45 cumulative years of partnering with Esri and using their solutions in addition to members of our team working directly for Esri. We monitor Esri's platform development and look for ways to incorporate the latest advances into our solutions. We are well versed in incorporating Esri technology into enterprise web and mobile technologies. The close relationship with Esri allows for the speedy resolution of questions/concerns/technical issues with the Esri platform. This is a massive benefit in the planning/development/implementation of any Esri-based solution.

Our expertise is not limited to just Esri technology but includes a host of supporting and related technologies as well. This includes but is not limited to Microsoft, Amazon AWS, PostgreSQL, Oracle, Safe Software FME, Autodesk, Adobe, QGIS, Bentley, and Linux.

The CGS team is composed of GIS Professionals certified by the GIS Certification Institute (GISCI) and Esri, Asset Management Professionals credentialed by the Institute for Asset Management and holding Fellow of the IAM status (highest professional credential), credentialed Project Management Professionals (PMP), and credentialed Agile Scrum professionals. We also hold a host of other technical certifications related to GIS and IT from Microsoft, CompTIA and others.

CGS uniquely comprises individuals with deep expertise in GIS program development, Enterprise Data Governance, ISO 55001 asset management, and EAM/CMMS (enterprise asset management/computerized maintenance management) implementation. Our team has worked as senior GIS solutions architects leading major company programs in the utilities and public sector.

The CGS team elevates itself because it fully understands Spatial and Non-spatial data, **Data Governance Policies**, **Standards, Frameworks**, and the overall objective of organizational data needs. The Cultivate team has the expertise, experience with data and systems, and the right personnel in place to add unmatched value to this project.

CGS Professional Services Offerings

CGS services have evolved in alignment with the GIS and Utility industry. This is because many of the members of CGS are pioneers in the field and are active today. Most CGS members have worked directly for local or state governments and have served many years in delivering GIS-based solutions and plans. At an elevated level, CGS offers the following key services:

GIS Services: Strategic Planning, COTS Configuration, Staff Augmentation, Technical Support, Training, and Infrastructure Management Digitization. Our GIS-centric solutions optimize the use of location data to ensure the realization of business goals and high ROI (return on investment).

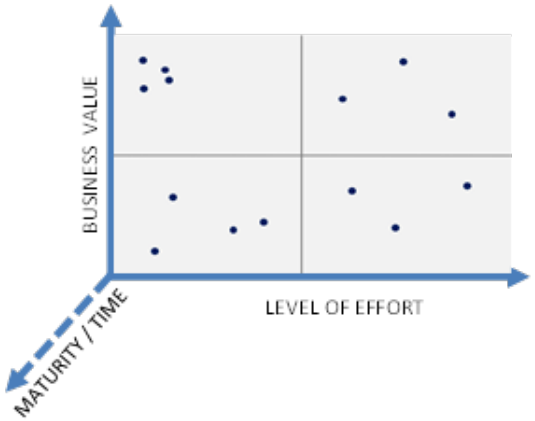
Data Services: Data Governance, Data Warehousing Integration and Conversion, and Business Intelligence Reporting/Dashboarding. CGS offers various supporting services to help organizations achieve data governance (policy), design, business intelligence, dashboarding, security, and systems integration. As a turn-key solution provider, we have experience in both back-office and end-user development.

Asset Management: Strategic Planning Acquisition Management, Operations Management, Risk Analysis, and Budget/Forecasting. Asset management is more than software; it is the harmony of people, processes, data, and technology, all working towards a common goal – getting the agency's assets to deliver value to stakeholders at the lowest cost and least risk. CGS offers diverse services, including asset management maturity assessments, specialized asset management training, and re-aligning your GIS and EAM/CMMS to ensure measurable progress towards asset management goals.

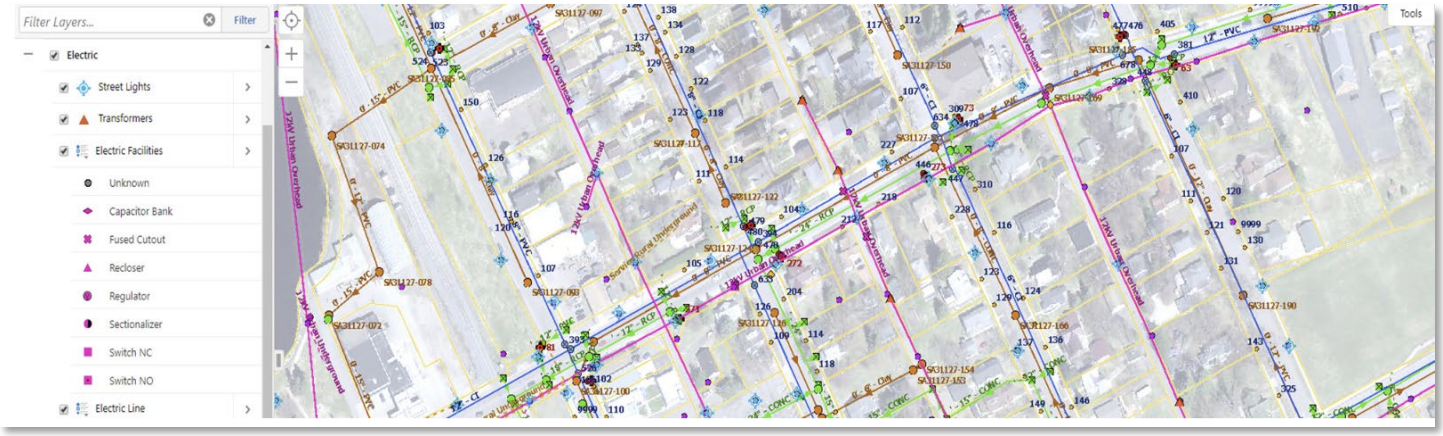
Software Development: We specialize in Enterprise Architecture Web Development, Mobile Development, and System Integration Design. GIS Web and Database application development are also our specialty. CGS has over 30 years of experience designing and building award-winning custom software tailored to meet specific client needs.

CGS Key Differentiators

Enterprise GIS Program Strategic Planning Expertise: CGS excels in guiding our municipal utility clients through the process of Enterprise GIS Program Strategic Planning, leveraging our comprehensive Discovery analysis process. Through this process, clients receive a thorough assessment of their GIS needs, challenges, and opportunities. Key deliverables include:



- Sewer asset management and GIS expertise.
- Identification of current GIS capabilities and gaps.
- Analysis of organizational objectives and requirements.
- Development of a roadmap outlining strategic goals and actionable steps. Recommendations for optimizing resources and maximizing return on investment (ROI).



Subconsultant Company Overview (1Spatial)

1Spatial is a global leader in providing Location Master Data Management (LMDM) software, solutions and business applications, primarily to the Government, Utilities, Transport and Building &Construction sectors.

Pioneers in location master data management, we enrich and enhance location data, enabling critical decision making and improved data governance. Our powerful technology helps organizations take cost-effective control of their spatial and non-spatial data throughout its lifecycle, making it fit for purpose, compliant, and of a consistent quality. We do this by automating the data validation, auditing, cleansing, synchronization and maintenance of data across the entire data ecosystem, enabling better decisions and greater insights.

Our domain expertise and data agnostic approach allow us to be an integral and important part of the Geospatial Ecosystem, supporting the wider digital economy. We partner with major technology consultancies and GIS providers such as ESRI and bring together our people's innovative solutions, industry knowledge and experience from our extensive customer base to deliver world-class solutions.

1Spatial is headquartered in Cambridge, UK, with operations in the UK, Ireland, USA, France, Belgium, Tunisia, and Australia.

B) Project Experience

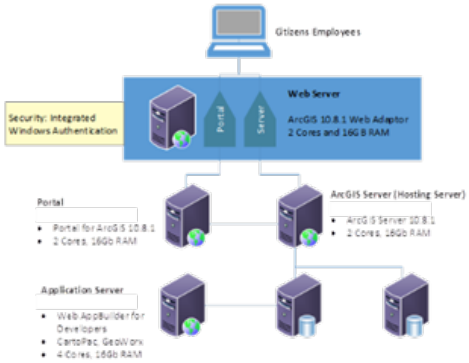
CGS understands the complex and evolving business needs of utilities and municipalities, leveraging extensive experience in delivering innovative, sustainable GIS solutions that enhance operational efficiency, data-driven decision-making, and long-term resilience. Our deep knowledge of workflows, regulatory requirements, and emerging geospatial technologies allows us to provide tailored solutions that drive efficiency, transparency, and improved public services. CGS invites the GUC to contact any of our clients to learn more about their positive experiences collaborating with our team. Below are CGS Team examples, as requested. Additional references can be provided upon request. Our Team has a long list of clients who will attest that our deliverables meet or exceed expectations on a regular basis.

CGS Team Related Project Experience

Citizen's Energy Group

CGS supported Citizens Energy's GIS through knowledge transfer and strategic consulting, resolving application issues and developing a user guide and administrators' guide for the application. A second phase of the project was funded to have CGS make changes and modifications to the GView application to provide enhancements to the user experience, deploy the application to staging and production environments, and provide testing and documentation for the application.

CGS provides ongoing GIS supporting services that include:



- assistance migrating their Gas system data to the Utility Network that included data assessment, cleanup, application enhancements, and documentation.
- adjusting and integrating their GView application to support migration.
- developing a water trace geoprocessing service that performs an isolation trace back to connected valves. This was then integrated into their GView application
- developed a curb cut tracking and reporting solution that included email notification triggers, dashboards, GIS integration and training
- Integrated new Gas Utility Network data with KloudGIN solution

City of Irving, TX

The City of Irving is partnering with 1Spatial to migrate its utility data from Esri's geometric network to the modern Esri Utility Network (UN). Using 1Integrate and 1Data Gateway, 1Spatial automates and validates the migration process to ensure data quality, connectivity, and compliance with Esri standards. The project began with a kickoff and domain-specific sessions for water, wastewater, and stormwater, setting clear communication protocols and configuring validation tools tailored to each utility system. During the data assessment phase, 1Spatial uses business rules and schema mapping to identify and resolve data quality issues in collaboration with the City's subject matter experts.

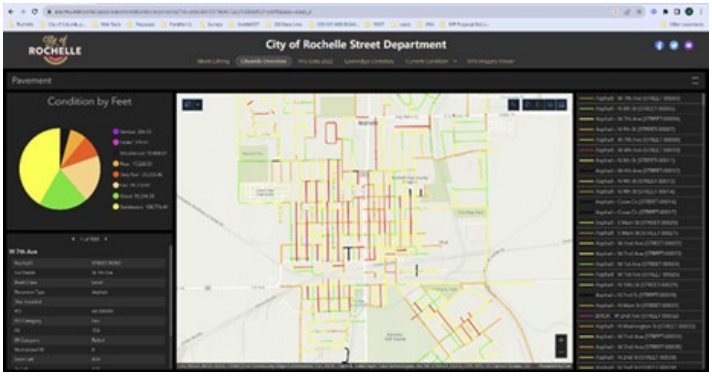
For the migration, 1Spatial applies an automated, iterative approach, beginning with a "vertical thin slice" migration to gather early feedback and support parallel development. After migrating to the staging schema, a Utility Network Connectivity Assessment ensures compliance with UN rules. Any new or adjusted rules are finalized in a closing workshop, with unresolved issues returned to City staff for review. 1Spatial provides ongoing project management using Agile and RUP methodologies, and final deliverables include migration reports and a ready-to-use file

geodatabase. The project also includes software licenses and training for up to six users, with a total cost of approximately $220,000 and completion expected by February 2026.

City of Rochelle, IL

CGS currently provides ongoing daily GIS Management consulting support for all Departments in the City of Rochelle. CGS works closely with each Department to identify a unique and prioritized GIS Work Program that is revisited annually based on new priorities and business needs. CGS manages the City's ArcGIS Enterprise and ArcGIS Online content and associated web maps, applications, and integrations with 3rd party systems such as their enterprise asset management (EAMS) and enterprise resource planning (ERP) systems. CGS provides the tools and continuous support for enterprise GIS database design, system architecture planning, GIS data editing/modifications, data schema design, metadata design, attribute rules, and custom scripting, as necessary. CGS provides the following ongoing GIS professional services support for the City of Rochelle:

- Rochelle utility data (water, electric, advanced communications (fiber optic) Utility Network data development
- Strategic planning, needs assessment, prioritization, and GIS audits for up to 10 Departments
- Solution configuration with Esri tools
- Business process analysis to maximize GIS return on investment (ROI)
- ArcGIS Enterprise administration and management
- GIS system design and implementation
- Geodatabase design
- Performance testing and tuning
- GIS-centric software development
- Asset management and GIS integration support
- Break/GIS (servers, map services, etc)
- Digitization and data conversion services
- Web map and map service creation
- Data governance roadmaps
- Training and training documentation



Our team has the following additional experience performing these migrations and working with municipal utilities in general with other organizations.

- City of Lawrenceville, GA - (Electrical)
- City of Union City, GA – Water, Sanitary Sewer, and Stormwater
- City of Coral Springs, FL – Water and Sanitary Sewer
- City of Boynton Beach, FL – Water and Sanitary Sewer

Holland Board of Public Works

The **Holland Board of Public Works (BPW)** sought a partner to accelerate their UN ArcGIS migration journey. They needed not only an automated solution but also responsive and dedicated resources. 1Spatial proved to be the perfect partner. With their automated migration tools and expert support, **Holland BPW** was able to complete their migration efficiently. The collaboration with 1Spatial ensured that the data was accurately migrated, and the new system was up and running smoothly.

Hear more: **[US] Utilities - Case Study: Holland BPW**

Hunter Water Case Study

Hunter Water, a major utility provider in Australia, faced the challenge of migrating their extensive utility network to the ArcGIS Utility Network. They needed a solution that could handle the complexity of their data while ensuring accuracy and efficiency. 1Spatial stepped in with its comprehensive suite of tools and services, including the **UN Readiness App** and the **UN Validation App**. These tools helped **Hunter Water** assess its data quality, fix issues, and validate the migration process. As a result, Hunter Water successfully transitioned to the new system, enhancing its operational capabilities and data integrity.

Hunter Water's GIS Lead, Sam De Lore, said -

The partnership has delivered better-than-expected results. "Through our partnership with 1Spatial, we have seen a major improvement to our data quality, migration & validation processes. Prior to the implementation of the 1Spatial tools, we were limited to reactively fixing errors identified by the data migration after it was complete. Initially, this was yielding high error counts impacting testing & the development of critical integrations."

"We are now able to assess our source data before, during and after the migration process with the tools designed and configured by the 1Spatial team. Our error count has come down to 0.01%, resulting in the successful build of subnetworks across our service area for the first time," said Mr De Lore.

Hunter Water - Showcasing Success: Making Data Fit for ArcGIS Utility Network

Welsh Water, UK

Welsh Water in the UK has also achieved significant milestones with 1Spatial's support. By leveraging 1Spatial's innovative solutions, Welsh Water has been able to streamline their utility network migration, ensuring data accuracy and operational efficiency.

*"As part of our preparations to deliver ESRI ArcGIS Pro and migrate from the Geometric Network to the Utility Network, we reached out to 1Spatial to help us assess the health of our existing asset data. 1Spatial supported us in the use of their **UN Readiness App**, which provided a comprehensive assessment quickly and easily. The results gave us the insights and reassurances that we were hoping for, so that we can move forward with confidence."* **Andrew Mulder, GIS Product Owner, Dwr Cymru Welsh Water**

CGS Team References

Joe McKamey GIS Product Owner Information Technology Citizens Energy Group 2020 N Meridian Street Indianapolis, IN 46202 (317) 652-2908 jmckamey@citizensenergygroup.com	**Neil Besteman** GIS Specialist Engineering Department Holland Board of Public Works 625 Hastings Ave, Holland, MI 49423 616-355-1547 office 616-260-5029 cell www.hollandbpw.com
Pat Brust Director, Information Technology Rochelle Municipal Utilities 910 Technology Parkway Rochelle, IL 61068 pbrust@rmu.net 815-561-2 052	**Joan Keene, GISP** GIS Director, ISS Department Hamilton County, Indiana 1 Hamilton County Square Noblesville, IN 46060 Joan.Keene@hamiltoncounty.in.gov (317) 776-8254

Approach and Solution Design

GUC provides electric, water, sewer and natural gas services to the areas of the City of Greenville and Pitt County North Carolina. The electrical distribution system is the second largest in North Carolina with over 1,284 miles of overhead lines, 2,166 miles of underground lines, 24 substations, 18,095 transformers and more. The natural gas system is the largest municipal in the State with 684 miles of mains, 503 miles of services, 21 meter stations, 4,553 valves, and more. GUC is seeking to enlist the services of a qualified and experience consultant to develop a migration plan to the Esri Utility Network. This plan needs to provide a comprehensive analysis, design, migration plan, recommendations, and risk mitigation required to the move to the Utility Network (UN).

As indicated in the GUC RFP, this project requires a multiple step approach to ensure GUC is set up for a successful migration to the Esri Utility Network (UN).

GIS Design & Data Quality

GIS plays a vital role in GUC's operations and is currently supported by a high-availability architecture to ensure

consistent accessibility, reliability, and performance. Accordingly, the new Utility Network (UN) design must maintain these same standards to support mission-critical functions. In parallel with the migration and system design, CGS will conduct a comprehensive assessment of existing GIS data for the Electrical and Natural Gas systems to identify and address any issues that could impact the transition to the UN. The updated data model will fully incorporate Utility Network requirements, including necessary attribute and spatial rules, to ensure a seamless and robust migration.

To develop a GIS design that accomplishes this, the CGS team will do the following:

Task/Service	Description

Discovery	Conduct a discovery of the current GIS Implementation to include data design, systems architecture, and supported business needs.
	• Create a survey using Survey123 for GUC Staff to complete that will help explain the current architecture, published services, deployed applications, data size and schema.
	• Conduct 2 days of onsite meetings/workshops with key stakeholders to
	  ○ Review the results of the survey and CGS' understanding of the existing implementation
	  ○ Determine business requirements for the new implementation of the UN.
	  ○ Review current workflows and processes
	• Conduct follow-up remote meetings as needed to clarify understandings and specific GUC needs with GUC Staff

Data Assessment	The UN requires data to be clean and follow specific connectivity rules in order to ensure a successful migration. To determine the initial effort required to prepare GUC's electrical and gas system data for migration to the UN, CGS' team will use 1Spatial's Readiness Application to conduct a review of the data. This application expands the capabilities of existing Esri migrations tool and will allow us to create a more complete report of issues that might impact the migration to the UN. We will: • Identify spatial and connectivity issues in the data that violate UN requirements • Identify attribute issues that violate UN and GUC custom requirements • Create a report that describes conditions and error types found that can be referenced. These rules are indicators to the groupings of non-conformities needing remediation, or what type of edits require attention. A full description of 1Spatial's Readiness Application can be found in Appendix A: 1Spatial UN Migration Apps

Task/Service	Description
Data Model Development	Upon completion of the discovery and data assessment, CGS will develop a proposed data mode based on the Esri UN foundational model. This will be customized to meet anticipated GUC business and integration needs.
Data Quality and Migration Planning	The UN is more than just a new data model but also includes tools and workflows from Esri to assist users in getting the most from this new solution. This requires organizations migrating to the UN to not only migrate data but to also change their processes to use, maintain and visualize their data. To facilitate this process migration CGS will: • Document current workflows associated with the existing geometric network model • Map existing processes to those associated with Esri UN tools and processes • Provide recommendations for any existing required workflows that do not match Esri recommended best practices, workflows or tools • Provide recommendations for a process that will ensure data quality throughout migration process

GIS Design Deliverables:

- Summary Discovery report of findings and notes from surveys and meetings.
- Data readiness report
- Proposed UN Data Model
- Data Quality, Process and Workflow Migration Plan

Assumptions/Requirements:

1. GUC will provide CGS with access to the existing GIS data for the Electrical and Natural Gas systems.
2. Any documents or diagrams that outline current architecture
3. List of software licenses available to support this project

System Integration

Like many of CGS's clients, GUC has integrated GIS with key business systems such as CIS, SCADA, OMS, and planning/design platforms—integrations that are essential to daily operations. As part of this project, CGS will evaluate these integrations for compatibility with the Utility Network, with particular emphasis on OMS and Planning/Design, where GUC has already identified existing compatibility challenges. CGS brings extensive experience and a wide range of integration tools, including application APIs, native data converters, creating custom ETL tools using application SDKsSafe Software FME, Power Automate, Python scripting, and database replication. The selection of integration tools will be carefully tailored to meet GUC's specific technical requirements and operational priorities.

Like many of the clients CGS works with, GUC has integrated GIS with several other business solutions including CIS, SCADA, OMS, and planning/design. Thess integrations are critical to the daily operations of GUC. GUC

expects that these integrations be evaluated to determine compatibility with the UN with a focus on OMS and Planning/Design. GUC has already identified compatibility issues with their OMS and the UN.

Dependences to utilize the tools listed above include the following:

1. Capabilities of native applications
2. Available licensing
3. How quickly and frequently does the data need to be updated and accessible in the GIS or native application
4. Strength and power of supporting architecture

CGS has a strong track record of helping clients integrate GIS with other systems to enhance data accessibility, improve decision-making, and increase operational efficiency. For example, we recently supported Caltech in integrating CAD-based floorplans and their Asset Information Management System (AIMS) with GIS, enabling detailed visualization of campus buildings, rooms, and assets. We are also actively working with Caltrans to link their Aerial Imagery Archive and scanning solution with GIS, allowing for streamlined retrieval of historical imagery based on attributes such as route, LRS location, county, flight date, and aerial vendor. Additional ongoing integrations with organizations such as Citizens Energy, the City of Rochelle, and Hamilton County further demonstrate CGS's depth of experience in delivering tailored, high-impact GIS integration solutions.

CGS will evaluate the current integrations and develop a System Integration Plan to support the UN Migration. To do that, the CGS Team will perform the following:

Task/Service	Description
Evaluate Current Integrations	CGS will investigate and document all current integrations with GIS including CIS, SCADA, OMS and Planning/Design. This will involve: • Meet during the discovery in the GIS Design phase with GUC staff to review the status and configuration of existing integrations • Review current published ArcGIS Enterprise web services and applications to determine what exists, how it is published/updated, who is using them, and how are they being accessed. • Determine criticality/priority of these integrations to determine **Data Synchronization** frequency and required **Availability** • Evaluate integration methods supported by these other business solutions to determine **viability** for UN integration • Determine alternative options if direct integration with the UN is not possible
Design Integration Plan	After CGS evaluates the current integrations, our team of experts will develop and design an integration plan with current business systems and published ArcGIS Enterprise web services and applications to support the UN migration. This plan will include:

Task/Service	Description
	• Recommended changes, tuning, updates, and customization to current ArcGIS Enterprise web services and applications required to support the UN migration • Data Synchronization and Availability process/method recommendations to support the seamless flow of data between GIS and integrated applications for outage management, operational control, planning and design as well as asset updates. • Recommendations for alternative methods of integration for those applications that are not compatible with the UN including project impacts to budget and timeline. This plan will be provided to GUC as a draft for review and comment. GUC input will then be evaluated by CGS and integrated into the final plan.

System Integration Deliverables:

- Current GIS integration evaluation
- System Integration Plan

Data Quality

CGS has merged **Data Quality** with **GIS Design** as the two go hand in hand based on our experience. The new UN data model must include rules and tools to ensure data quality during and post migration. The Data Readiness report will include a listing of all discovered issues and recommended corrective action.

System Architecture

As mentioned, GIS has become a critical part of GUC operations. As a result, GUC has deployed a high availability environment on-premises. This includes a combination of clustering and load balancing. However, GUC believes more efficient architectures and technologies may be available.

Robust enterprise GIS architecture design is nothing new to CGS. As you can see in the projects already referred to in this proposal. In addition to those projects, CGS has assisted other clients in the design of reliable, secure and accessible designs. Recently CGS worked with the IT team at Caltech to design high availability AWS Cloud based architecture to support their ArcGIS Enterprise Implementation that is being used for space management, campus planning, tree management and more. This included load balancing, backup and restore planning, scaling, and SSO implementation with ArcGIS Enterprise. This is just one more example of our expertise in this area.

The CGS team of certified and experienced GIS and IT professionals will review the current architecture and provide recommendations based on our experience and industry best practices to an efficient and secure

architecture is designed to support a secure and highly accessible solution.

Task/Service	Description
Review Current Architecture	CGS will conduct a review of the currently implemented architecture used for the GIS. This will include: • Review current hardware • Review network configuration and traffic • Review backup and automations • Exam logs for ArcGIS Enterprise to determine what maps, services and apps are being utilized most • Review security solutions and policies including use of SSO and MFA • Review specific business and security requirements with key GUC staff
Architecture Design Recommendations	Based on the requirements and needs determined in the current architecture review, combined with the UN requirements and industry best practices, CGS will create a recommended system architecture to support the new UN deployment. This will include: • Recommendation to keep on premises or cloud implementation • Architecture design including recommended sizing based on estimated usage, expected future growth and industry best practices as well as failover capabilities based on required availability desired by GUC. • Backup and restore methods to ensure quick system restores • Recommendation for implementing toolsets such as Esri UN Management Console and other recommended tools for ensuring data quality. • Recommendation for monitoring solutions such as Esri ArcGIS Monitor or other potential solutions. • List of Key Metrics to monitor to ensure optimal operation of UN solutions when deployed. • Security recommendations including the use of SSO and MFA to protect the new implementation.

System Architecture Deliverables:

- System Architecture Design to support UN Migration

Training and Knowledge Transfer

CGS approaches this project as a collaborative partnership, recognizing that success depends on ensuring all stakeholders share a clear and consistent understanding. This is particularly important for a technically complex effort like the Utility Network, which involves specialized components and terminology. To support this, CGS emphasizes continuous knowledge transfer throughout the project. Several members of our team are former Esri Certified Trainers and university instructors, bringing both a strong commitment to education and the proven ability to communicate complex concepts effectively.

To facilitate this training and knowledge transfer, CGS will perform the following services as identified on the following table:

Task/Service	Description
Discovery Meetings	During the Discovery Meetings conducted under the GIS Design and Data Quality task, CGS will also conduct UN presentations that will cover what the UN is and general requirements for its implementation.
Regular Meetings	CGS will schedule regular weekly or bi-weekly project meetings with GUC staff to review project status, answer questions and address any concerns.
Deliverable Reviews	CGS will review all deliverables with GUC staff to ensure understanding and acceptance.
Recommended Resources	CGS will provide recommendations to resources and materials that provide clearer understanding of the Esri UN and its requirements. In addition, resources will be provided for any recommendations CGS provides for architecture or integration design where available.

Knowledge Transfer Deliverables:

- PowerPoint Presentation explaining UN and its Requirements
- Regular meeting schedule and meeting notes
- Recommend resources documentation and links as needed

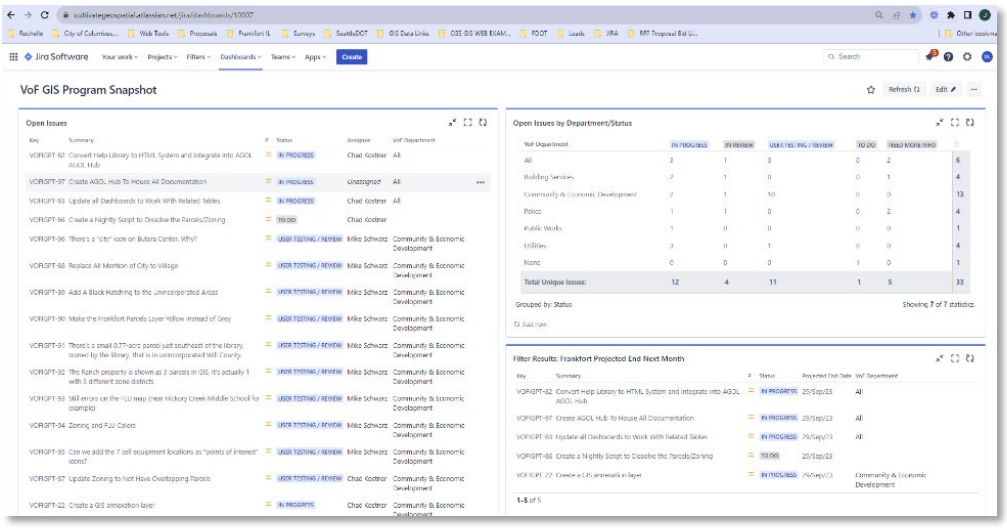
Project Management Strategy

Following Project Management Institute's (PMI) guidelines listed in the previous section, CGS will utilize an agile approach to program management based on collaboration and the ability of the implementation team and stakeholder organization to work together openly and collaboratively. It relies on the constant inspection and adaptation of the process itself and the backlog of requirements. As such, it is a communications-intensive approach to data strategy plan development and implementation. This day-to-day operational structure will ensure transparency throughout the project lifecycle and provide the ability to identify any risks or impediments early. Additionally, we understand that we may be working with third parties during the implementation of the project and would utilize this collaborative approach to problem-solving to work towards solutions together as well as to define expectations of each agile iteration through open communication, documentation, and agreement.

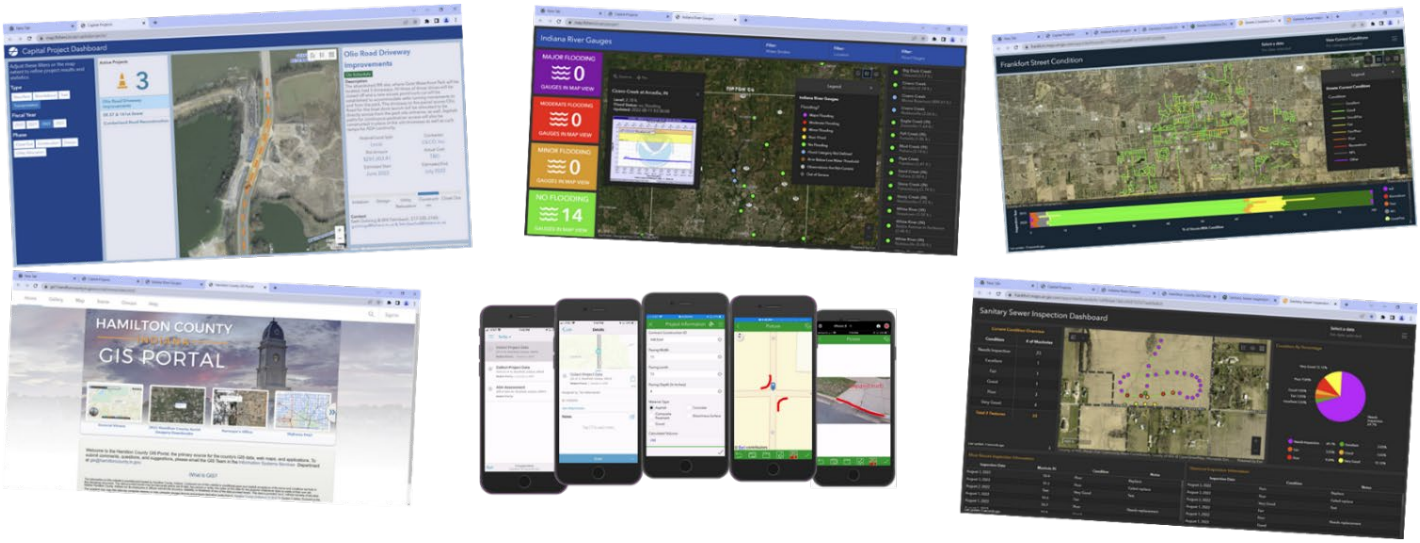
Project Task-Level Ticketing System Overview

CGS will implement a project task ticketing system in JIRA, or other GUC preferred methods for tracking individual task needs and their progress. The benefit of the ticket tracking system is to communicate and collaborate with the GUC on ticket needs and status as constant communication between CGS and the GUC is critical to the success of the project. We have found that our process for setting up the CGS Project-level JIRA ticketing system has been very helpful for both quality assurance and control, but also to ensure 100% transparency with GUC at all times for all tasks. Each task will be assigned a date entered, project description, priority status, and project end date, and allows for in-ticket project team collaboration between the CGS staff originator, and the affiliated GUC Department. Once a ticket is created, a notification is sent to the CGS task owner and the GUC stakeholder to whom the ticket is affiliated.

CGS will also create an Administrative Project dashboard that shows the full Program ticket snapshot of work, where certain GUC **JIRA notifiers will have the ability to view any ticket 24/7.** Furthermore, CGS will provide high performance in project leadership, schedule management, tracking budget and expenditures, quality control, and assurance, maintain accurate record keeping and follow-up on all action items, and shall deliver services within the established budget. Changes to the scope that impact or may impact the project budget or cost shall be identified and brought to the GUC's attention in a timely fashion such that appropriate measures can be developed, and actions taken to avoid or control potential impacts. As per the Communication Plan we will develop in the Project Plan documentation (pre-discovery), CGS will attend meetings as determined to be appropriate and needed in the various tasks, as well as prepare all related agendas. All agendas and supporting information shall be distributed via email to the GUC's project manager/POC at least one (1) business day before any meetings.



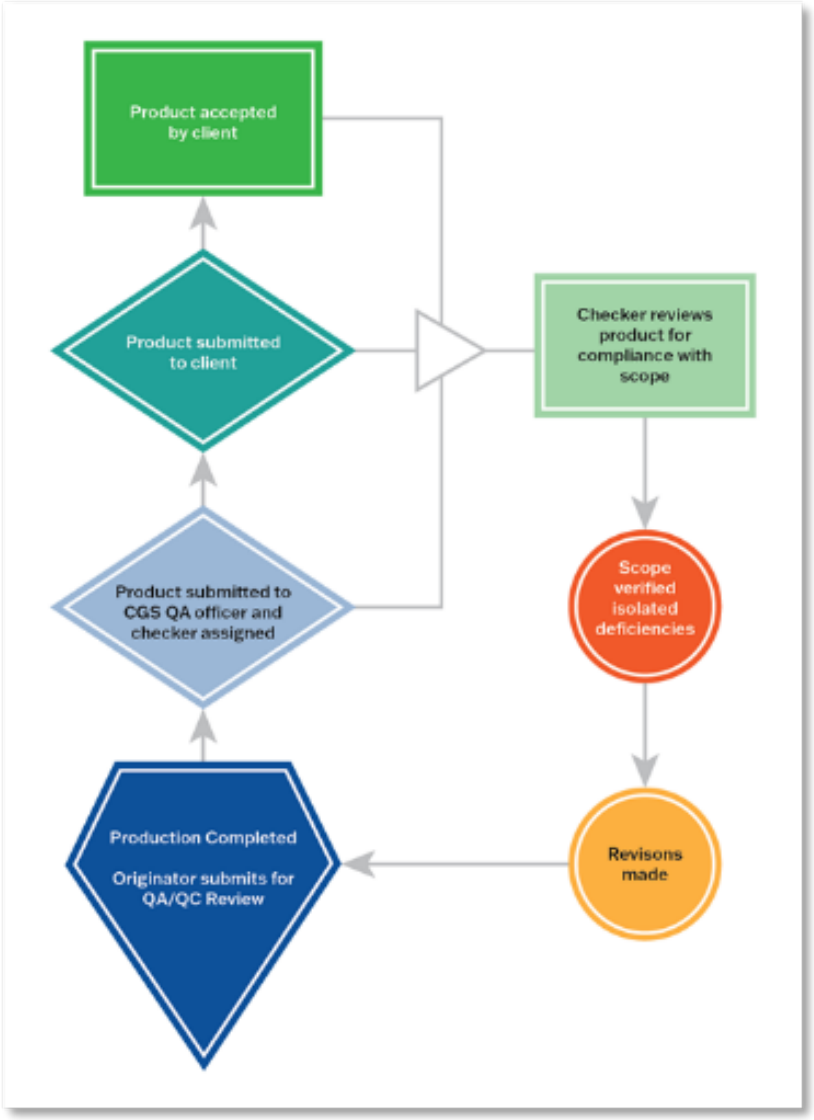
Sample JIRA Program Overview Dashboard



CGS Sample System Data Catalog Dashboard – Allows users to visualize information on Data status

CGS Quality Control Processes

CGS takes quality control on projects very seriously and adheres to the strictest policies for all our projects. To that end, CGS has developed a Team Management Plan process as part of our project management execution process. The CGS Team management plan is intended to ensure the efficient utilization of team staff and resources; cost-effective delivery of products, services, and materials; a quality assurance/quality control (QA/QC) procedure with peer review and concurrence checks at critical milestones; a realistic scheduling of activities, and clear communication between the City and CGS key team staff. In addition to the project manager and program manager assigned to the project, CGS also has several certified project management professionals (PMPs) on staff that routinely assist project staff in quality control/quality assurance capacity.



CGS Project Quality Control Process Workflow

All CGS deliverables will follow a strict internal quality control process of (1) checking, (2) concurrence with comments, (3) change incorporation into the document/product, and (4) verification that the change was completed. In so doing, we will ensure that the deliverables are held to the highest standards. Sign-off forms and procedures are necessary at critical junctures in the project and are designed to finalize decisions so that the project can be finished as proposed. These points of agreement are designed to protect both the City and CGS if key personnel on the project should change after critical decisions that affect design, development, and budget have been made.

Project Work Plan

CGS proposes the following work plan schedule based on our scope of work provided above and the desired schedule GUC indicated in the RFP. It is assumed that the project will start no later than June 2025 to allow at least 5 months to complete the project.

	Month				
Task	**1ST**	**2nd**	**3rd**	**4th**	**5th**
Kick Off Meeting					
Regular Weekly or Bi-weekly meetings					
Discovery – Survey					
Discovery – Meetings/Workshops					
Data Assessment					
Date Model Development					
Data Quality and Migration Plan					
Evaluate Integrations					
Integration Plan					
Review current architecture					
Architecture Design Recommendations					
Final Deliverables and Project Closeout					

CGS Team Project Staff

The CGS Team brings extensive expertise in Esri Utility Network migration, Portal installation, and ArcGIS Enterprise upgrades, ensuring a seamless transition. Our staff comprises seasoned GIS professionals, solution architects, and system administrators, each with extensive experience in implementing and managing Esri's Utility Network, ArcGIS Enterprise, and web GIS solutions. The team is adept at handling complex migrations, optimizing system performance, and configuring secure, scalable GIS environments like GUC's. By leveraging industry best practices and deep technical proficiency, CGS ensures a successful deployment that enhances operational efficiency, data integrity, and long-term system sustainability. The following table describes our team bio composition and team organizational chart:

Key Staff Bios

Name (Firm)	Project Role	Years Exp.	Education / Certifications
Ashley Hitt, PMP, GISP (CGS) 	Project Manager (Direct Point of Contact), GIS Technology SME	15	• VP-level geospatial professional with 15+ years of experience. • Excels in business analysis, business operations, staff leadership, strategic planning, written communications, public speaking, client relationships, and business development. • Extensive experience gathering requirements, documenting as-is business process workflows, financial cost analysis and opportunity assessments. • Certified PMP, GISP; URISA/GPN Past President • GIS Leadership Academy Graduate & Instructor • M.S., Geoscience and B.S., Geography
Tripp Corbin, MCP, GISP (CGS) 	Assistant Project Manager, GIS Technology SME	28	• 28+ years designing, implementing, and supporting GIS solutions for municipalities, utilities, educational institutions and non-profits • Certified GISP (Certified Geographic Information System Professional) • Multiple technical GIS & IT certification from Esri, Microsoft, CompTIA, and Camtasia • Author of 4 books on ArcGIS Pro • Past President URISA/GPN, President of Georgia Geospatial Association, GISCI Board Member GIS Leadership Academy Graduate & Instructor

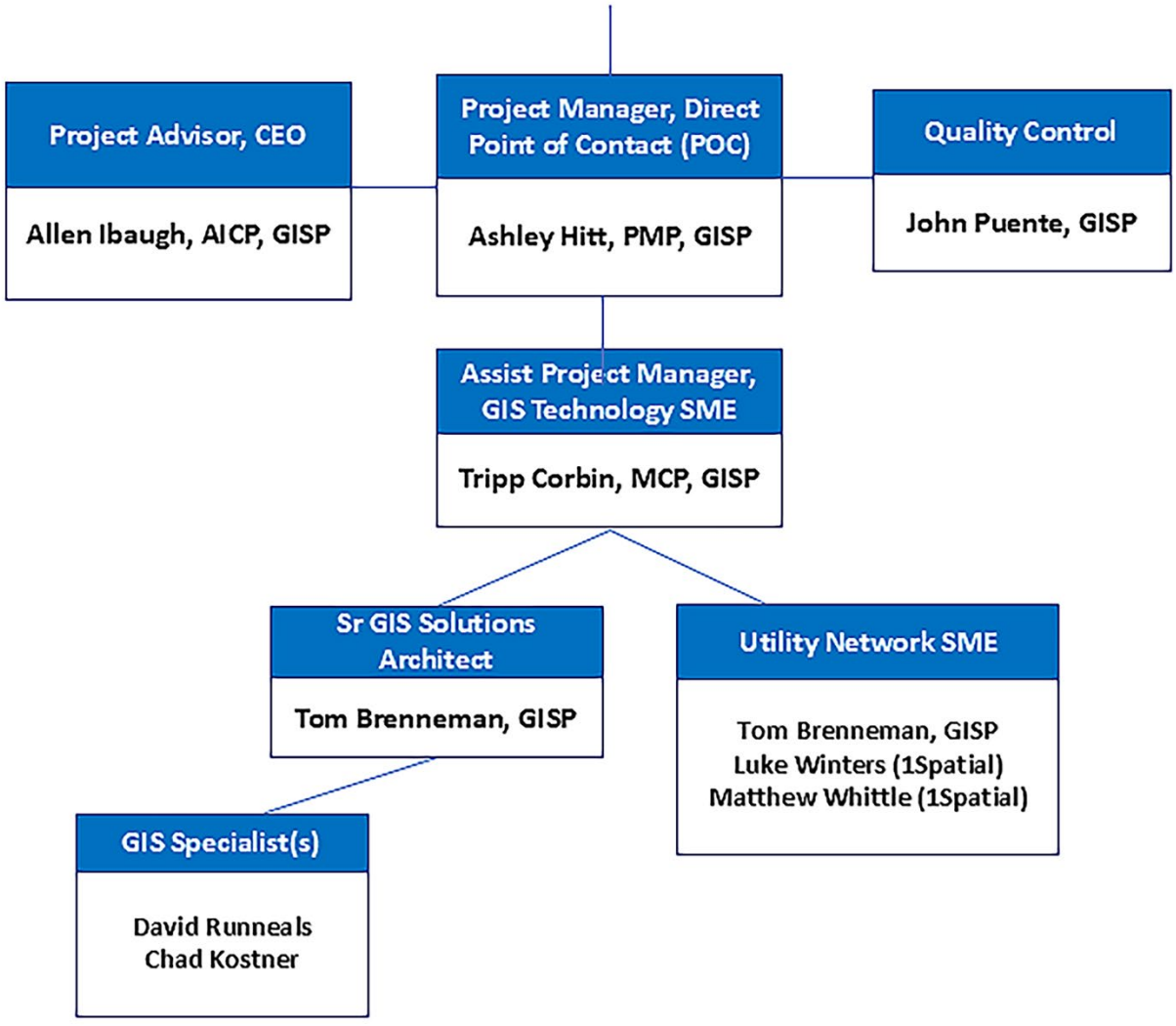
Name (Firm)	Project Role	Years Exp.	Education / Certifications
Tom Brenneman, GISP (CGS) 	GIS Solution Architect/Training	28	• 28+ years of expertise in developing and configuring Esri software applications including ArcGIS Enterprise, ArcGIS Online, and other Esri software applications. • Utility Network design and implementation expert • During a 25-year career at Esri, excelled at several roles including: Instructor, Author, Product Manager, GIS Consultant, Business Development Solution Engineer, and Solution Engineer Manager. More than 9 years focused on solutions for the transportation industry. • Certified GISP (Certified Geographic Information System Professional) • M.A, Geography., B.A., Geography • B.S., Environmental Science
Chad Kostner (CGS) 	GIS Specialist (Lead)	23	• Accomplished GIS Specialist with over 23 years of extensive experience managing and developing an enterprise GIS in the private and public sectors. • Expertise in streamlining workflows using Python, ModelBuilder, SQL and Arcade • Currently serves as a lead GIS Specialist providing ongoing enterprise GIS support services for our municipal clients, including the City of Rochelle, IL, City of Warrenville, IL, and the Village of Frankfort, IL. • Examples of support services provided include the Creation of Esri map digital and hard copy products for all client Departments, maintenance and oversight of ArcGIS Enterprise, including development of web applications and mobile field tools for field work and administration dashboards uniquely depicting, and summarizing data. • A.S. GIS Technology

Name (Firm)	Project Role	Years Exp.	Education / Certifications
David Runneals, FMEP, FMESP, FMEBP 	GIS Solutions Architect, ETL Specialist	15	• 15+ years of experience implementing and supporting enterprise GIS solutions including ArcGIS Enterprise, Portal, Monitor, Hub, and Image Server • Certified on Safe Software FME ETL platform • Expertise with SQL Server and Oracle Databases • Experience using Python, FME Workbench, ArcGIS ModelBuilder, and Power Automate to streamline workflows
John Puente, GISP (CGS) 	Data Governance/Quality Control	36	• 36 years of experience in the public sector with a focus on transportation and transit. Core disciplines include data governance, business intelligence, program management, and GIS strategic planning • Served Ohio DOT for 35+ years working at multiple Districts a key Asset Management SME, and Chief Data Officer for the Ohio Department of Transportation. Successfully implementing a data governance program for Ohio DOT from the ground up. • BS, Management Interdisciplinary Studies
Matthew Whittle (1Spatial) 	Senior Utility Network Consultant (90%)	11	• Matthew is a Senior Consultant with 1Spatial Inc. with experience in GIS and 1Integrate. Matthew has worked on numerous projects focused on emergency services, positional accuracy improvement and validation. Matthew's academic training in both geography and computer science positions him well to support our customers. Matthew brings our team a broad breath of technical experience working with geospatial quality initiatives. He has consultant experience for multiple organizations including Verizon and Google. • Matthew is a highly skilled GIS Analyst with a robust background in telecoms, demonstrated through impactful positions at 3-GIS. Excelled in implementing, troubleshooting, and enhancing GIS solutions, leveraging expertise in Esri software, Python scripting, and database management.

Name (Firm)	Project Role	Years Exp.	Education / Certifications
			Proven ability to communicate technical solutions effectively, showcasing leadership and technical prowess in optimizing GIS architectures and workflows. • BS, Biology
Luke Winters (1Spatial) 	Utility Network Solutions Engineer	5	• Luke Winters is a Solutions Engineer for 1Spaital Inc. He has experience assisting various customers create innovative solutions by leveraging the 1Spatial software platform. Luke specializes in solutions utilities, transportation, and facilities management verticals. Some of his key solutions include validating, enhancing, and inferring utility data to smooth the transition to the ESRI Utility Network, configuration of transportation networks, and cross-source validation of Computer Aided Design (CAD) and Building Information Management (BIM) data. • BS, Computer Information Systems MS, Geographic Information Systems

Detailed Resumes can be found in Appendix A: Resumes

CGS Team Organizational Chart



Proposed Project Costs

As requested by GUC, CGS has provided two fee methods, Lump Sum and Time and Materials.

Lump Sum Fee

CGS will provide the services outlined in this proposal for the lump sum fees provided below. Invoices will be issues monthly based on estimated percent complete for each project task.

Project Phase	Project Costs
GIS Design and Data Quality	$29,740.00
System Integration	$8,500.00
System Architecture	$10,090.00
Training and Knowledge Transfer	$2,800.00
Total Cost	**$51,130.00**

Time and Materials

If GUC elects, CGS can provide the services for a Time and Materials based fee. We estimate the total fee for this project will be **$51,130.00 (Fifty-One Thousand One Hundred Thirty Dollars)** and will not exceed that amount without the written approval of GUC.

Our rate schedule for this type of fee is provided below. Invoices will be issued monthly based on the hours worked by CGS individuals and subconsultants plus any reimbursable expenses associated with this project.

Staff Title/Role or expense	Rate
Principal/Project Advisor	$320.00
Project Manager	$150.00
Assistant Project Manager	$140.00
GIS Solutions Architect	$150.00
GIS Specialist	$120.00
Data Governance/Quality Control	$140.00
Senior Utility Network Consultant	$280.00
Utility Network Solutions Engineer	$220.00

The hourly rates listed in the previous table are valid throughout the calendar year of 2025. CGS charges the current IRS rate for any mileage incurred by our staff or subcontractors traveling in personal or company vehicles to provide services associated with this project. All other travel or reimbursable expenses are invoiced as incurred.

Data and Security Strategy

At Cultivate Geospatial Solutions (CGS), we prioritize the security of all geospatial data, ensuring that client information is safeguarded through a multi-layered security framework. Our security framework encompasses several key areas: encryption standards, access control, device authentication, and intrusion detection measures. These measures are designed to provide robust protection for both our internal systems and client-facing applications, maintaining confidentiality, integrity, and availability of data.

1. Encryption Standards

Encryption is a critical component in safeguarding sensitive data during storage and transmission. CGS implements advanced encryption protocols to ensure that all data remains protected across various touchpoints:

- **Data in Transit:** All communication between client devices, our servers, and external systems is encrypted using Transport Layer Security (TLS) protocols, ensuring the confidentiality of data while it is being transmitted over the network.
- **Data at Rest:** We employ AES-256 (Advanced Encryption Standard) encryption for data at rest, providing a high level of protection for sensitive geospatial data stored in our systems. AES-256 is recognized for its strength and ability to safeguard large datasets from unauthorized access.
- **Key Management:** Our encryption keys are managed and rotated regularly through an industry-standard Key Management System (KMS), ensuring the security of encryption keys and minimizing the risk of key compromise.

2. Access Control

Access control is essential for limiting the ability to view or modify sensitive data. CGS implements a rigorous set of access control measures, grounded in the principle of least privilege:

- **Role-Based Access Control (RBAC):** We assign access rights based on user roles, ensuring that individuals only have access to the data necessary for their tasks. This minimizes the risk of accidental or unauthorized data exposure.
- **Multi-Factor Authentication (MFA):** To strengthen authentication, CGS requires multi-factor authentication for accessing critical systems. This involves a combination of something the user knows (password) and something the user has (authentication token or mobile device).

- **Periodic Access Reviews:** Regular reviews and audits are conducted to assess user access levels and ensure that permissions are aligned with current roles and responsibilities.
- **Fine-Grained Permissions:** For sensitive data, CGS uses fine-grained permissions to control who can view, modify, or delete particular datasets, allowing us to enforce strict security measures on a dataset-by-dataset basis.

3. Device Authentication

Ensuring that only authorized devices can access our systems and data is essential for protecting against unauthorized access and potential threats. CGS employs several measures to secure device access:

- **Device Enrollment and Management:** All devices accessing CGS systems must be enrolled and authorized through a centralized Mobile Device Management (MDM) solution. This allows us to monitor and manage the security posture of devices connecting to our systems.
- **Device-Level Security Policies:** We implement strict device security policies, including enforcing device encryption, ensuring that all devices accessing our systems are up to date with the latest security patches, and requiring strong passwords or biometric authentication.
- **Endpoint Security:** All devices are equipped with antivirus and anti-malware software, which is regularly updated to mitigate threats from emerging security vulnerabilities.

4. Intrusion Detection Measures

Protecting our network from potential intrusions and identifying anomalous activities is an essential part of our security framework. CGS employs advanced intrusion detection and monitoring measures:

- **Network Intrusion Detection Systems (NIDS):** Our systems are equipped with NIDS, which continuously monitor network traffic for unusual patterns and potential security breaches. This allows us to quickly detect unauthorized access attempts or suspicious activities.
- **Security Information and Event Management (SIEM):** We utilize a SIEM solution to aggregate and analyze logs from across our network, providing real-time alerts for any security incidents or vulnerabilities. This system helps us to proactively detect and respond to potential threats before they impact our operations.
- **Anomaly Detection:** We employ machine learning and behavioral analysis techniques to identify unusual patterns or behaviors within our network traffic and user activities. This allows us to detect novel and evolving security threats, even those that may bypass traditional signature-based defenses.
- **Regular Penetration Testing:** CGS conducts periodic penetration testing to evaluate the resilience of our systems against potential exploits. These tests help us identify vulnerabilities in our infrastructure before they can be leveraged by malicious actors.

Appendix A: 1Spatial UN Migration Apps

The Esri Utility Network for ArcGIS includes powerful tools and data models to analyze and assist in the management of utilities including electric, gas, water, sewer, and stormwater. As powerful as the Utility Network is, a successful migration requires much forethought, data assessment and knowledge transfer. 1Spatial has developed several SaaS based UN Migration tools that can be leveraged as part of the migration process. Customers have seen the data remediation hours cut in half by leveraging these tools. Organizations have differing priorities and justifications for migrating to ESRI Utility Network (UN), including upgrading platforms to ArcGIS Pro and increased network functionality. However, in order to achieve the future state desired, organizations must migrate data to the new model and adhere to numerous rules and conditions.

Esri's best practice states:

- For a properly functioning utility network **the error count should be as close to 0 as possible**.
- Error counts greater than 10,000 have severe performance and functionality implications.

To ensure the data is not an issue, preparation is required before migrating to UN. Our approach allows organizations to quickly iterate through their existing networks, ensuring their data is ready for the Utility Network.

How it Works:

UN Migration Suite of Apps

1. Readiness App
2. Migration App
3. Validation app

-Cloud Service delivered as:

Software as a Service (SaaS)

- No software to install
- Quick and easy to get started
- Secure platform
- Can be installed on-premise if required

-Access via an intuitive web portal

- Drag and drop
- Self-serve

-Upload your data in an Esri File Geodatabase (.gdb)

- Zipped up (.zip)
- Other formats are supported if required

UN Readiness App:

With the UN Readiness application, you can easily assess your current network data and get it ready for migration.

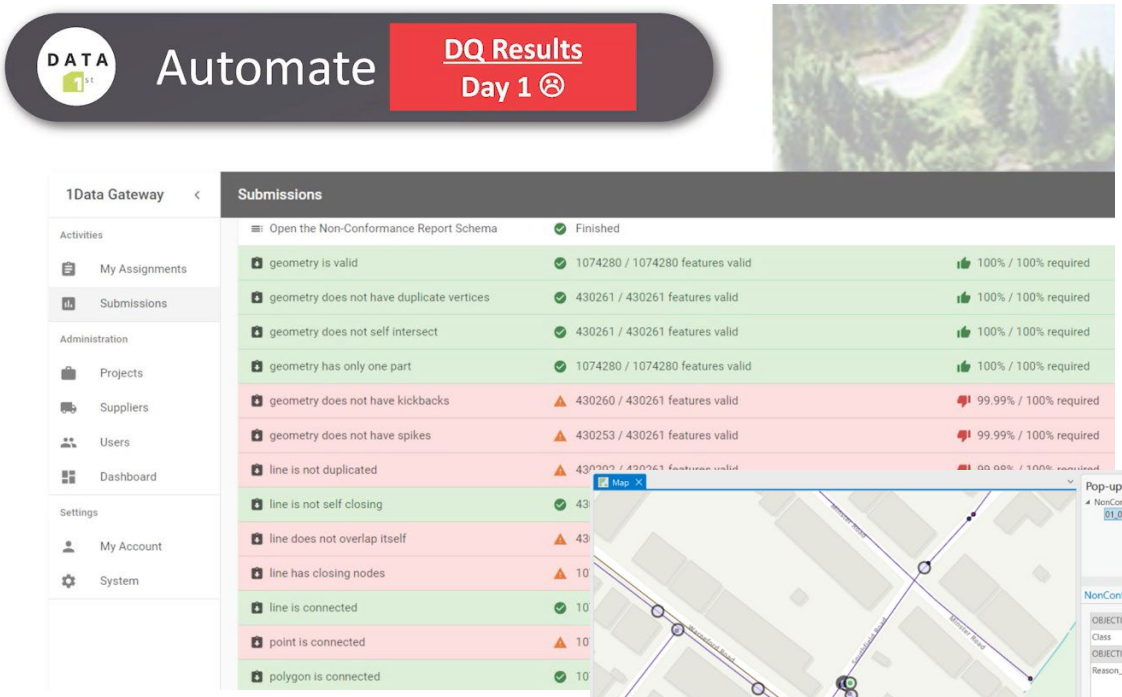
Data quality issues are much easier to fix at source, so taking this approach will save lots of time and effort later in the process. Users Log in and have a tile to access the pre-built application.

The Readiness App will:

- Assess current network data quickly
- Report on Errors – spatial report
- Allow users to fix Data Quality issues identified - easier to do in source rather than in future.
- Re-Submit to validate – Set quality levels and verify data meets thresholds.

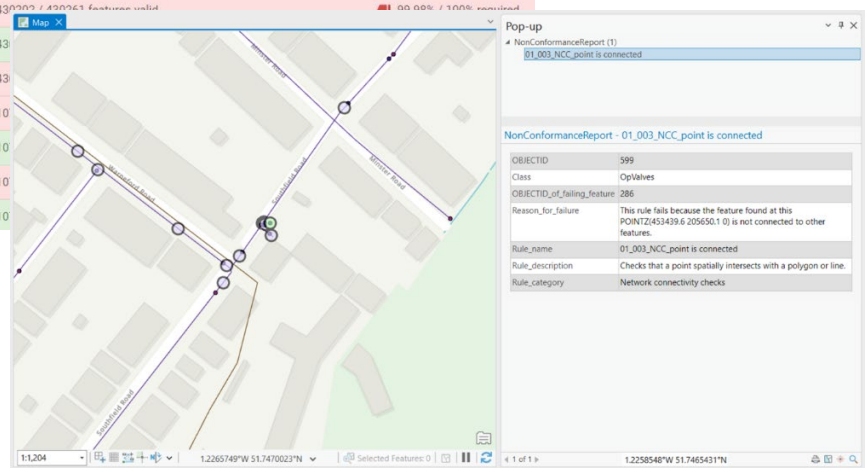
Day One

Post Log In, a data file can be uploaded and processed immediately. We have seen files from other utilities with 125,000 features obtain results in 30 minutes. Performance can vary based on other factors, complexity and compute power etc. but the speed will allow quick understanding of what errors are contained with the data.



The spatial report of errors can be loaded back into a GIS as a markup layer which depicts the locations and types of error conditions that need attention.

The solution includes documentation that describes conditions and error types that can be referenced. These rules are indicators to the groupings of non-conformities needing remediation, or what type of edits require attention. Once

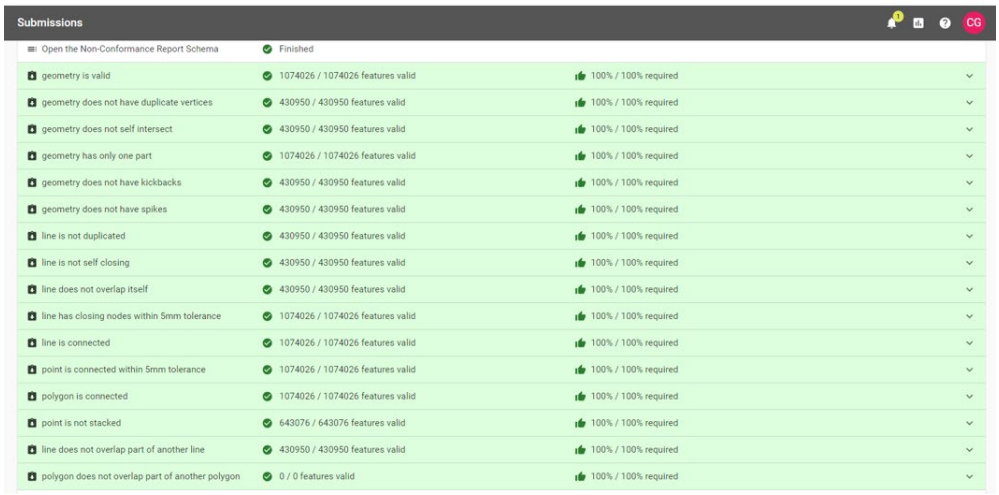


the spatial report is loaded as markup layer it becomes an easy process to filter and isolate what edits must be performed.

Once edits are completed the user can re-submit the data to the Readiness App. This is typically an iterative process, where editors will correct data, re-validate, and download any remaining non-conforming markups. The goal is to iterate and validate 100% conformance.

UN Migration App

The Migration app utilizes the Asset Package to ensure an iterative approach. It supports a Data-driven schema transformation, enabling data to move from its current format into the Utility Network target model. Combined with the UN Readiness App and the UN Validation App you can rinse and repeat efficiently. This way we are working in a 'staging' database and can build up confidence before we publish into the Esri system.



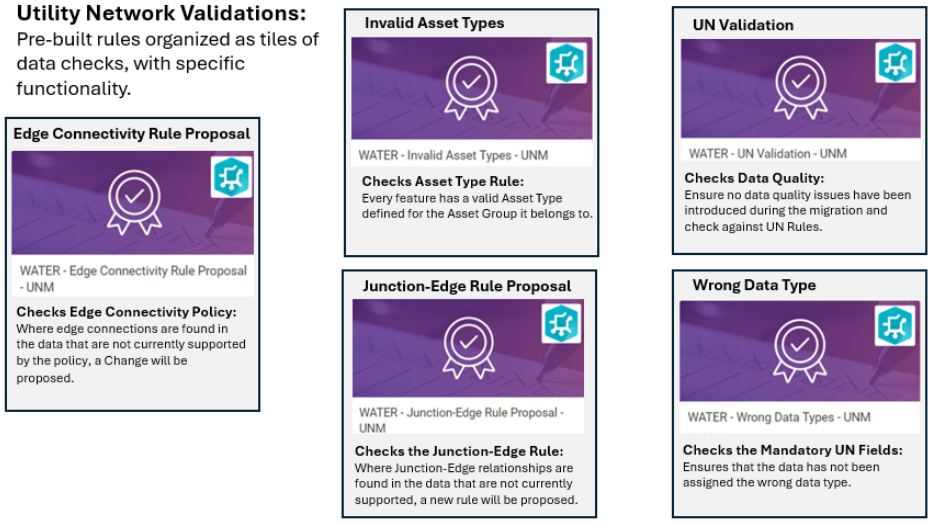
The migration itself is a case of mapping from the data's current schema to the new Utility Network model. This process is data-driven and can be tweaked with each iteration until it is determined it conforms with the right target model.

UN Validation App

Once your data is in an Asset Package in your target UN schema, our UN Validation App can check for data quality and conformance with the configured UN Rules. These validation rules include the rules from the UN Readiness app to ensure no additional errors have been introduced during the migration process, as well as more specific rules to pre-validate UN errors. Importantly, these rules pre-validate every intersection in your network against Esri's UN connectivity rules in your target model, allowing you to remediate individual non-conforming features and/or adapt the network connectivity rules to better fit your data.

The UN Validation application runs rules in these categories:

- Geometric
- Attribution
- Topological



Summary

The migration, approach, and use of these apps will help organize the process and provide easy to use UI's that accelerate the GIS users experience and provide visibility to the data issues that could prevent a successful UN migration and load.

Data quality and integrity is critical in order to have command and confidence issued through the application of rules and validations. By going through the process organizations are basically self-certifying their data is conforming to the target model and system requirements. This is why we have designed a recommended approach and a suite of tools to help speed up your migration and make. it as seamless as possible.

Clients have seen that our apps have assisted significantly with the time and effort to perform a UN Migration successfully, easing their migration and ensuring their networks are fully operational.

Appendix B: Detailed Resumes

The following are detailed resumes for key people on the CGS Team that will be assigned to this project. They show the breath of their professional experience not only on projects of similar scope but across the industry as a whole.

EXPERIENCE
17 years

EDUCATION
- Western Kentucky University
  Bowling Green, KY

ROLES
- Program Management
- Project Management
- Resource Management
- Business Analyst
- Senior Consultant
- Trainer

INDUSTRY APPLICATION
- Utilities
- Planning
- Transportation
- Local Government

CERTIFICATIONS
- GIS Professional Cert (GISP) #63741
- Project Management Professional (PMP)

SKILLS
- Project Management
- Strategic Planning
- Product Testing
- ArcGIS Platform
- Spatial Analysis
- Business Systems Integration
- Database Administration
- Jira

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Ashley Hitt, GISP, PMP

Business Analyst

ahitt@cultivategeospatial.com

PROFESSIONAL OVERVIEW

Geospatial business, and project management professional with 17 years of experience. Excels in operations, staff leadership, strategic planning, written communications, public speaking, client relationships, and business development. Certified GISP and PMP, immediate Past-President of URISA, and instructor/facilitator of the URISA GIS Leadership Academy.

CGS Project Experience

- **City of Indianapolis GIS Managed Services, 2023 – Present**; Project Manager
  As Project Manager, Ms. Hitt provides comprehensive daily management and consulting services for the City of Indianapolis, IN's GIS ArcGIS Enterprise and ArcGIS Online systems. In this role, Ashley led the delivery of essential tools and ongoing support for enterprise GIS database design, system architecture planning, and GIS data editing/modifications. Key responsibilities included designing data schemas, creating metadata, and developing attribute rules and custom scripts to enhance the efficiency of the city's GIS program. Ashley also managed the seamless integration of third-party data systems, ensuring the project remained on time and within budget.

- **Arizona Department of Transportation; ArcGIS Online Data Supply Chain and Maps Update Project, 2023-2024**; *Project Manager*
  Served as Project Manager to develop ADOT's Multimodal Planning Division (MPD) ArcGIS Online data supply chain, update all existing online maps and applications to have current data and consistent branding, have a defined process with the data supply chain, and create a self-service online mapping resource to empower non-GIS users to create their own maps.

- **City of Columbus, OH; Asset Information Management Systems (AIMS), 2022-2024;** *Project Manager*
  Served as Project Manager to develop a custom GIS centric asset management solution built around the Esri ArcGIS Platform. She was responsible for ensuring both the client and CGS staff were on the same page functionality requirements, roll out process, and schedule. Ms. Hitt provided client coordination, budget monitoring and conducted product testing as new tools and capabilities were deployed.

- **Ohio Department of Transportation; Transportation Information Mapping System (TIMS) Update; 2023-2024;** ***Project Manager***
  Project Manager for the ODOT TIMS Transportation Information Mapping System (TIMS) update. TIMS is a browser-based application that serves as ODOT's web mapping portal where users can discover information about Ohio's transportation system, create maps, and share information. TIMS is a public-facing enterprise web mapping portal for accessing ODOT's geospatial information, and it publishes data from 13 ODOT District offices and external agencies as part of a central data repository.

Other Project Experience

Connected Nation / Louisville, KY & Bowling Green, KY 2007-2023

- Oversaw operations of GeoAnalytics department, including staff supervision, deliverables execution, project management, budget development and managing multi-million-dollar projects, and mobilization of vendors.
- Coordinated client status reports and produced technical writing deliverables, developed and delivered internal and stakeholder presentations, including legislative testimony.
- Facilitated strategic planning and developed narrative for proposals and RFP/RFI responses.
- Presented proposals, scopes of work, reports, and findings to clients, state and national telecommunications and geospatial associations, state and federal agencies, and state and federal elected officials.
- Developed location intelligence strategies to promote data visualization solutions, evaluated potential partnership, and maintained active partner relationships.
- Reported to the nonprofit's board of directors on major projects and collaborated on key strategic initiatives.
- Supported filing of federal grant reporting requirements through documentation development, review of data models, and preparation of quantitative analyses/results.

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EXPERIENCE
28+

EDUCATION
- Southern Polytechnic Univ. Marietta, GA
- Surveying & Engineering Related Coursework
- GIS Leadership Academy, URISA

ROLES
- Project Manager
- Senior GIS Professional
- Trainer/Course Author
- Technical Writer
- Business Development

INDUSTRY APPLICATION
- Local Government
- Utilities
- Field Collection
- Engineering
- Parcel Management
- Planning
- Educational Institutions

CERTIFICATIONS
- GIS Professional Cert (GISP) #48813
- CompTIA Technical Trainer, Cert. # 001020099976
- Esri ArcGIS Pro Professional 2025
- Esri ArcGIS Pro Associate 2101
- Esri Desktop Professional
- Esri Enterprise Design Associate
- Microsoft Cert. Professional
- Camtasia User Certification Cert. # z7eppavvkpsd

Charles C. (Tripp) Corbin III MCP, GISP

Assistant Project Manager, GIS Technology SME

tcorbin@cultivategeospatial.com

PROFESSIONAL OVERVIEW

As a geospatial professional, Mr. Corbin has over twenty-eight years of experience in orchestrating and managing surveying, mapping, and GIS projects. He has assisted a wide range of organization design, implement, and use geospatial solutions. He is recognized as an industry expert with a variety of geospatial software packages including Esri, Autodesk and Trimble products.

Mr. Corbin's expertise is demonstrated through the multiple professional and technology certifications he holds from organizations including Esri, Microsoft, CompTIA, the GIS Certification Institute and others. In addition, he has written four (4) books on Esri's ArcGIS Pro desktop application and taught GIS classes at various universities including NC State's Institute for Transportation Research and Education and University of North Alabama's Continuing Education Center.

CGS Project Experience

- **City of Goshen, IN; GIS Support and Consulting;** *Project Manager/Senior GIS Professional/SME*
  As the Project Manager and Senior GIS Professional, Mr. Corbin leads a team of GIS specialists, analysts and technicians supporting the GIS Coordinator for the City of Goshen. He facilitates ongoing communication with the client and team, ensuring projects move forward and stay on track. Mr. Corbin provides his expert guidance to help develop solutions required to support City operations. Recently he has worked with the City and his team to develop a workflow and tool to assess sidewalks and prioritize expenditures to upgrade them and begun working with the City to evaluate their utility data for migration to the Esri Utility Network

- **Caltech, CA; ArcGIS Enterprise Implementation and Integration with Asset Information Management Systems (AIMS);** *Project Manager/Senior GIS Professional/SME*
  As the Project Manager and Senior GIS Professional, Mr. Corbin leads a team of GIS architects, specialists, analysts and technicians to implement ArcGIS Enterprise in an Amazon AWS environment to support Caltech's new space and asset management initiative. This has included designing the AWS architecture, installing and configuring ArcGIS Enterprise, Importing CAD floorplan data into the Esri ArcGIS Indoors data model, integrating GIS with Caltech's AiMs solution, and creating a basic data viewing application. Phase 2 of this project will include importing additional CAD floorplans into GIS, developing custom web applications to provide controlled access to Caltech Departments and creating data editing and analysis workflows.

- **Licking County OH; GIS Strategy Road Map and Oracle to SQL Migration;** Assistant *Project Manager/Senior GIS Professional/SME*
  Mr. Corbin was part of the team responsible for conducting the initial discovery of the County's current GIS implementation including supporting architecture, database schema, workflows, and users. From there he worked with other members if the CGS team to develop a GIS Strategic Roadmap to guide the future development of GIS with the County to include migration from Oracle to SQL Server, implementation of newer versions of ArcGIS Enterprise, migration from ArcMap to ArcGIS Pro and the named user license model, and migration of existing web applications. He facilitates ongoing communication with the client and team, ensuring this project moves forward and stays on track.

Awards & Honors

- URISA Exemplary Leadership Award – 2014
- URISA Barbara Hirsch Special Service Award – 2013
- Esri Top Authorized Instructor - 2007

Military Experience

- United States Navy (88-93), 2ND Class Petty Officer Operations Specialist
- Honorably Discharged
- Awards/Metals
- Good Conduct Metal, Navy Unit Citation, National Defense Metal Sea Service Ribbon Kuwait Liberation Metal Southeast Asia Service

- **Florida Forest Service, FL; ArcGIS Pro Migration Training;** *Project Manager/Instructor/Course Developer/SME*
  To support the Florida Forest Service's ongoing migration to ArcGIS Pro, Mr. Corbin developed and conducted a series of training courses. These courses were conducted onsite at the Florida Forest Service in Tallahassee Florida. The courses included an ArcGIS Pro for Beginners and Intermediate ArcGIS Pro. Mr. Corbin coordinated with the GIS staff at the Florida Forest Service to create these courses from the catalog of topics CGS has developed, scheduled the course offerings, and worked on the overall budget. He then provided GIS technical support for those that attended the training afterwards.

OTHER PROFESSIONAL EXPERIENCE

2022-2024, Business Development Manager/SME, GIS – Surveying And Mapping, LLC (SAM) - As the Business Development Manager at SAM Companies, He spearheaded the growth of GIS business in the southeast through client relations, conference attendance, and proposal writing. He developed SOPs for client training. Served as a subject matter expert for projects involving the Esri ArcGIS Platform working with various clients throughout the US including local governments, utilities and state agencies to implement ArcGIS Enterprise, ArcGIS Online, ArcGIS Pro, Field Maps, Enterprise Geodatabases and Utility networks.

2019-2022, GIS Implementation Manager – Davey Resource Group, Inc. (DRG) - Oversaw a team of GIS Solution Architects and Analyst setting up new projects with a focus in utilities (Electric, Teleco, Sewer, Water, and Stormwater). This included database design, field data collection methods, QA/QC process, project reporting dashboards and reports and customizations. He coordinated with other divisions in the DRG as needed for additional resources and project handoffs. Mr. Corbin assisted business development efforts as a GIS SME. He managed ArcGIS Enterprise implementations and ArcGIS Online including users, licenses, and published content. Troubleshoot user issues both in the office and field. Develop, document and implement SOPs for various projects. Supervised the design and implementation of newer technologies including ArcGIS Enterprise, Field Maps, Survey123, SQL Reporting Server and more.

2011-2019, CEO, eGIS Associates, Inc. - Responsible for overseeing daily company operations including strategic planning, daily operations, marketing, and sales. Manage client relationships. Provides senior oversight to spatial analysis and data development projects. Design and oversee implementation of GIS solutions for government, non-profit, and private companies. Lead a team of trainers conducting classes on various GIS related platforms including ArcGIS, ERDAS, QGIS and more. Author and oversee development of new training materials. Manage business partner relationships with Esri, Hexagon and FacilityDude.

2001-2011, Vice President GIS/IT, Keck & Wood, Inc. - Responsible for the daily management of the GIS and IT departments. Planned, implemented, administered, and maintained company IT infrastructure. Managed all aspects of the GIS department including sales, marketing, proposals, project management, client relations and support. Oversaw the design, implementation and support for GIS with clients that included cities, counties, and municipal utilities throughout the southeast. Provided certified and custom training for ESRI's ArcGIS software to internal and external clients. Oversee development plan reviews for City and County clients. Served on Board of Directors.

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1996-2001, Network Administrator/GIS Project Manager, Keck & Wood, Inc. - Managed and administered company LAN. Established a company computer usage policy. Conducted quality control review for GIS projects. Recommended and installed networks and GIS/mapping systems for company and clients. Evaluated and recommended new equipment and software for company and clients.

sss1993-1996, Survey Crew/GIS Technician, Keck & Wood, Inc. - Created and maintained various types of maps for cities, counties and utilities using AutoCAD, AutoCAD Map, ArcCAD, ArcView, and Microstation. Served as part of a land survey field crew in various roles from rodman to crew chief. Worked on a variety of surveys including boundary retracements, topos, sanitary sewer and road alignment, and construction staking.

PUBLICATIONS/ARTICLES/VIDEOS

Cultivate YouTube Channel	https://www.youtube.com/@CultivateGS
eGIS Associates YouTube Channel	https://bitly.cx/LSJyE9 (Over 9,000 subscribers)
SAM YouTube Channel GIS Tech Tips Videos	https://bitly.cx/5NMr
ArcGIS Pro 3.x Cookbook	Pact Publishing – May 2025
Learning ArcGIS Pro 2	Packt Publishing – July 2020
ArcGIS Pro 2.x Cookbook	Packt Publishing – February 2018
Learning ArcGIS Pro	Packt Publishing - Dec 2015

PROFESSIONAL ORGANIZATIONS

Geospatial Professional Network (Formerly URISA)

- Past President
- Member
- GIS Leadership Academy Instructor

NC ArcGIS Users Group

Georgia Geospatial Association (Formerly GAURISA)

- President - 2025
- Vice President - 2024
- Member – 1999 to Present

Seven Hills Regional Users Group (SHRUG)

- Committee Member – 2024 to present
- Member – 2005 to present

GIS Certification Institute (GISCI)

- Board Member
- Certified Professional

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Tom Brenneman, GISP

GIS Solution Architect

tbrenneman@cultivategeospatial.com

EXPERIENCE
26 years

EDUCATION
University of Redlands
B.S. Environmental Science

ROLES
- Chief Technology Officer
- Technical Management
- Solution Engineer
- System Architect
- Senior Consultant
- Product Management
- Trainer / Course Author

INDUSTRY APPLICATION
- Transportation
- Planning
- Local and State Government
- Utilities
- Educational Institutions
- Software Development
- Systems Integrations

CERIFICATIONS
- GIS Professional Cert (GISP) #61509

SKILLS
- Project Management
- Strategic Planning
- ArcGIS Enterprise & Online Implementation, Administration, & Tuning
- Enterprise GIS Database Design and Modeling
- Amazon AWS/Microsoft Azure Architecture
- Workflow development
- ETL/Data conversion

PROFESSIONAL OVERVIEW

Mr. Brenneman is the Cultivate Geospatial Solution's (CGS) Chief Technology Officer (CTO) and software development team leader. Mr. Brenneman is a passionate GIS client advocate evidentiary through decades of real-world successes. Serving customers in the role of Instructor, Author, Product Manager, Geospatial Systems Architect design, Linear Referencing System (LRS) Expert, Business Development Solution Engineer, Project Manager, and Solution Engineer Manager.

Specifically, Mr. Brenneman has served dozens of customers in both the public and private sector. Mr. Brenneman's ongoing leadership includes expertise in Commercial off the Shelf (COTS) deployments, system integrations, as well as custom software development. Mr. Brenneman has served numerous Departments of Transportation, Local Governments, Airports, Ports, Rail, Roads, and Transit customers. Mr. Brenneman is a subject matter expert in all aspects of working with, establishing, and improving customer enterprise GIS frameworks.

CGS Project Experience

- **City of Columbus, OH; Asset Information Management Systems (AIMS), 2022;** *Project Technical Lead/Senior Software Architect*
  As the team leader and custom software developer, Mr. Brenneman led the discovery, design, and development of the enterprise AIMS solution. He facilitated ongoing communication throughout the project, guiding it from inception to final deployment. Working closely with AIMS project stakeholders, Mr. Brenneman was instrumental in developing the LRS database and tool editing processes, leveraging the Feature Manipulation Engine (FME) and Esri Roads and Highways. He also created training materials and conducted training sessions for City of Columbus LRS AIMS project stakeholders.

- **City of Columbus OH; Pavement Assessment Work-Limit Management System 2.0 (PAWS), 2021-2022;** *Project Technical Lead/Senior Software Architect*
  Technical team leader for the development and deployment of PAWS. Oversite of the CGS design and development team in coordination with customer team members. Identification of technology stack and GIS architecture with specific achievements that include time saving features and custom GIS capabilities in both the desktop and mobile environments.

- **City of Noblesville, IN GIS Management Services, 2021-Present;** *GIS Lead Consultant.* Leadership in GIS for the City of Noblesville, IN with Esri software and solutions. Maximizing software investments and data management practices. Sustainable solutions and software for optimized local government operations.

- Python/JavaScript/SQL
- Experience Builder
- GIS Analysis
- Technical Support/Training

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- **Sound Transit GIS Program Initiatives Study, 2022;** *Senior Technical Lead* Mr. Brenneman led the discovery and vision planning for Sound Transit's GIS Program, providing expertise across multiple areas including Esri licensing, enterprise system architecture, and end-user technology adoption. He reviewed existing workflows and asset management practices, conducting GIS data quality assessments. Additionally, Mr. Brenneman played a key role in strategic planning, offering insights into future returns on investment for GIS projects and software solutions. His contributions spanned GIS, CAD/3D Building Information Modeling (BIM), LRS design, and other systems critical to the operations of one of the largest transit agencies in the United States.

- **Hamilton County, IN; GIS Management Services, 2021-Present;** *GIS Lead Consultant* Mr. Brenneman provides ongoing GIS consultation and leadership to enhance county operations and the application of GIS in Hamilton County, IN. He supports the county's enterprise GIS program by assisting with software lifecycle planning, system integration, documentation, and training. His expertise includes designing and deploying custom and COTS applications within the Esri ArcGIS Enterprise environment, developing best practice guidelines, and ensuring effective knowledge transfer to promote long-term client success.

- **City of Westfield, IN; GIS Management Services, 2021-Present;** *GIS Lead Consultant* Team leader on software organization, upgrades, and deployment of GIS technology. Instrumental role in planning and application of various components of ArcGIS Online for specific operational city services and tasks.

OTHER PROFESSIONAL EXPERIENCE

Transportation Team Solution Engineer
ESRI
- Expert in real-world adoption of ArcGIS Roads & Highways (LRS) databases and models.
- Engaged State Departments of Transportation in enterprise transformation through GIS, including implementation of enterprise LRS databases.
- Advised and deployment Esri technology across various public sector customers as a trusted advisor.

State & Local Government Solution Engineer
ESRI
- Served as an Esri technology expert in configuration and full suite of applications
- Supported technical needs of regional customers
- Addressing and mapping of geospatial features expert
- Performed consulting services focused on ArcGIS Server administration and programming

Senior Consultant
ESRI
- Acted as technical advisor for sophisticated customers such as:
  - Louisville/Jefferson County Information Consortium (LOJIC)
  - Cincinnati Area Geographic Information System (CAGIS)
- Responsible for GIS design and application development projects

EXPERIENCE
37 years

EDUCATION
Univ. of Toledo, OH
B.S., Management
Interdisciplinary Studies

ROLES
- Data Solutions Director
- Quality Control & Assurance
- Data Management and Governance
- Project Leadership
- Strategic Planning

INDUSTRY APPLICATIONS
- Transportation
- Utilities
- Local Government
- Software Development
- Systems Integration

CERIFICATIONS
- GIS Professional Cert (GISP) #65610

MEMBERSHIPS
Frmr Chair, Transportation Asset Management Audit Inventory Group (TAMAG)

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John Puente, GISP

Data Governance/Quality Control

jpuente@cultivategeospatial.com

PROFILE
Highly driven leader with over 36 years of experience in the public sector with a focus on transportation and transit. Core disciplines include data governance, business intelligence, program management, strategic planning, and GIS. Recently, Mr. Puente served as the Chief Data Officer for the Ohio Department of Transportation, successfully implementing a data governance program from the ground up.

SAMPLE OF PROFESSIONAL EXPERIENCE
OHIO DEPARTMENT OF TRANSPORTATION

Data Governance
Led the execution of an agency wide Data Governance initiative
- Established Enterprise, Critical and Functional data standards
- Established ODOT's Data Governance Committee
- Established Data Governance Framework
- Defined organizational roles and responsibilities
- Adopted ODOT's Data Lifecycle

Enterprise Asset Management
- Major contributor to Transportation Asset Management plan resulting in a $400 million savings
- Develop objectives, requirements, deliverables, and testing for Ohio DOT asset management technology projects
- Liaison between AM technology project stakeholders and business owners
- Developed and enforced Enterprise Asset Management data standards

GIS
- Established Enterprise, Critical and Functional data standards
- Led the implementation for asset inventory collection software (Collector, Field Maps)
- Managed Augmented Reality initiative that resulted in allowing field staff to see existing and proposed construction environments using mobile devices
- Led project to convert engineering design files (MicroStation) to GIS elements leading to the digitization of construction project files

Planning & Program Administrator
- Managed $30 million annual District Budget and District One Major New projects
- Administrator for Small City, Transportation Enhancement and Municipal Bridge Local Projects Programs. Managed TRAC, TIGER II and Stimulus Programs
- Liaison between Central Office, Metropolitan Planning Organizations, FHWA, consultants, general public, and local governments agencies
- Supervised departmental employees responsible for all District One Capital Projects, Environmental Studies, Traffic Studies, Safety Program, District Workplans, and GIS

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David Runneals, FMEP, FMESP, FMEBP

Architect/ETL Specialist

drunneals@cultivategeospatial.com

EXPERIENCE
15 years

EDUCATION
Northwest Missouri State University, Maryville, MO – B.S. GISciences: Emergency & Disaster Management, 2019

ROLES
- Technical Management
- Raster ImageServer DBE
- Solution Architect
- Senior Software Developer
- Product Management
- Technical Support
- Technical Writer

INDUSTRY APPLICATION
- Transportation
- Local Government
- Asset Management
- Software Development

CERIFICATIONS
- Certified FME Business Professional August 2022-Current
- Certified FME Flow Professional July 2021-Current
- Certified FME Professional December 2019-Current

SKILLS
- Project Management
- ArcGIS Enterprise & Online Implementation, Administration, & Tuning
- Enterprise GIS Database Design and Modeling
- Amazon AWS/Microsoft Azure Architecture
- FME ETL/Data conversion
- Python/JavaScript/SQL/Microsoft Power Automate

PROFESSIONAL OVERVIEW

Mr. Runneals has over 15 years of experience and is a highly skilled GIS professional with extensive expertise in the ArcGIS platform, including Enterprise Portal, Online, Monitor, Apps, Services, and Hub. Proficient in integrating and managing complex data workflows using the FME Data Integration Platform (FME Form/FME Flow) and VertiGIS Studio/Geocortex (Web/Workflow), David excels in leveraging advanced GIS technologies to deliver robust spatial solutions.

His experience with various Esri data models, proficiency in Oracle Spatial and Non-Spatial databases, and Microsoft SQL underscore his strong technical foundation. David's adeptness with Microsoft Power Automate and Python also enables him to streamline processes and enhance operational efficiency across various GIS applications.

CGS PROJECT EXPERIENCE

- **Polis Center at Indiana University, IN;** *Senior Geospatial Technologies Architect*
  Mr. Runneals was responsible for the discovery, design, and development of a geospatial technology architecture plan. He assisted with the implementation of the plan. Mr. Runneals then created various ETL processes to translate and convert data using FME Workflows. He then wrote documentation detailing the use, integration and operation of the new solutions implemented for client staff.

- **Hamilton County, IN;** *Geospatial Technologies Architect*
  Mr. Runneals performed the discovery, design, and development of a migration plan to transition the existing enterprise GIS infrastructure from traditional physical servers to a virtualized environment, allowing for future growth and flexibility. geospatial technology architecture plan. He assisted with the implementation of the new virtualized architecture and migrating the existing GIS enterprise server content. Once migrated, Mr. Runneals then updated ArcGIS Enterprise to version 11.3 including Portal using PowerShell DSC.

- **Marion County, IN;** *Geospatial Technologies Architect*
  Mr. Runneals installed and configured ArcGIS Enterprise including Server, Portal, Web Adaptor, Data Store, Monitor and GeoEvent server across a multiple server environment that included a testing and production environment. He designed and implemented a data migration process that moved and performed ETL processes from Oracle to SQL Server.

AWARDS

- Esri Weekend of Innovation Finalist
- Esri SAG Award
- State Scoop 50 Award

- **City of Goshen, IN;** *Geospatial Technologies Architect*
  Mr. Runneals performed an upgrade of the City's existing ArcGIS Server to ArcGIS Enterprise including Server, Portal, Web Adaptor, and Data Store. He assisted in updating existing web services and applications to the newly upgraded architecture. He continues to provide ongoing technical support as needed to the City.

- **City of Carmel, IN;** *Geospatial Technologies Architect*
  Mr. Runneals performed an upgrade of the City's existing ArcGIS Server to ArcGIS Enterprise including Server, Portal, Web Adaptor, and Data Store. He assisted in updating existing web services and applications to the newly upgraded architecture. He continues to provide ongoing technical support as needed to the City.

OTHER PROFESSIONAL EXPERIENCE

- Technical Lead/SME for Enterprise Geospatial Data Engineering/Systems Integration with FME platform
- Authored FME Best Practices
- Curated datasets through data pipeline development (FME Flow) to update spatial data warehouse and REST services
- Developed Roads & Highways Custom Transformers (API) in FME Form and Flow
- Developed FME workbenches to pull data (ITS devices, events, and road conditions) from 511 systems and write to ArcGIS Online, including Castle Rock (which includes INDOT)
- Developed Winter Road Conditions FME workbenches to pull snowplow locations and images and write to ArcGIS Online in near-realtime
- Created ArcGIS Enterprise Administration tools using FME
- Created a GIS Health Status Dashboard processes using FME that evaluated data from data sources, FME Flow jobs, and data outputs to alert when an FME job or service was broken and not updating or not within a given count tolerance
- Led and managed agile projects with internal customers
- Oversaw re-architecture and migration efforts from one 10.7.1 to four new 10.8.1 ArcGIS Enterprise deployments
- Administered enterprise geospatial systems for 2,000 users
- Engineered a HR management system for Driver's License Station supervisors with ArcGIS Online
- Analyzed commercial drivers license data (ArcGIS Insights)
- Continued supporting clients' projects and fostering relationships from Iowa DOT GIS Internship
- Oversaw enterprise geospatial data schema development

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Chad Kostner

GIS Specialist

ckostner@cultivategeospatial.com

EXPERIENCE
23 years

EDUCATION
Chippewa Valley Technical College
A.S. GIS Technology

ROLES
- GIS Applications
- GIS Database Design/Editing
- Technical Support
- Workflow development
- Automation
- Training

INDUSTRY APPLICATION
- Local and State Government
- Software Development
- Systems Integrations

SKILLS
- Project Management
- ArcGIS Enterprise/ArcGIS Server Administration
- Enterprise GIS Database Design and Modeling
- Workflow development
- Data conversion
- ArcMap, ArcGIS Pro
- ESRI Field Maps
- QGIS/Open Source
- ArcGIS Online Development
- Python/JavaScript/SQL
- Experience Builder
- GIS Analysis
- Technical Support/Training

PROFESSIONAL OVERVIEW

Mr. Kostner is an accomplished GIS Specialist with over 18 years of extensive experience managing and developing an enterprise GIS in the private and public sectors. For this contract, Mr. Kostner currently serves as a GIS Specialist to our local government clients providing ongoing enterprise GIS support services for our local government clients, including the City of Rochelle, IL, and the Village of Frankfort, IL. Examples of support services provided include Creation of Esri map digital and hard copy products for all client Departments, maintenance and oversight of ArcGIS Enterprise, including development of web applications and mobile field tools for field work and administration dashboards uniquely depicting, and summarizing data.

CGS Project Experience

- **Village of Frankfort, IL – GIS Management Consulting Service,** *GIS Specialist*

  As part of the daily GIS Management consulting support for all Departments in the Village of Frankfort, Mr. Kostner works closely with each Department to identify a unique and prioritized GIS Work Program that is revisited annually based on new priorities and business needs. Mr. Kostner leads the technical support aspects of managing the Village's enterprise GIS databases, ArcGIS Online content, and associated web maps, applications, and integrations with 3rd party systems such as their pending enterprise resource planning (ERP) system. Mr. Kostner provides tools and continuous support for enterprise GIS database design, system architecture planning, GIS data editing/modifications, data schema design, metadata design, attribute rules, and custom scripting, as necessary.

- **City of Rochelle, IL – GIS Management Consulting Service,** *GIS Specialist*

  As part of the daily GIS Management consulting support for all Departments in the Village of Rochelle, Mr. Kostner works closely with each Department to identify a unique and prioritized GIS Work Program that is revisited annually based on new priorities and business needs. Mr. Kostner leads the technical support aspects of managing the Village's enterprise GIS databases, ArcGIS Online content, and associated web maps, applications, and integrations with 3rd party systems such as their enterprise asset management system (EAMS, and enterprise resource planning (ERP) system. Mr. Kostner provides ongoing tools and continuous support for enterprise GIS database design, system architecture planning, GIS data editing/modifications, data schema design, metadata design, attribute rules, and custom scripting, as necessary.

- **Caltrans, CA – GIS ETL Workflow Development and Automation,** *GIS Specialist*

  As part of a larger project to develop standards, methodology and applications to archive and retrieve historical imagery for the State of California. Mr. Kostner leads the development of automated workflows to georeference scanned images dating as far back as the 1940s into GIS and then creating searchable

metadata to make locating and retrieving images easier for Caltrans staff. Mr. Kostner is assisting with the required schema design to support this project as well as creating tools to be used in ArcGIS Pro to convert the scanned images to a standard format and specification, georeference the image indexes and individual image files, write out the required metadata and then publish multiple web services used to access and search the images.

Sound Transit GIS Program Initiatives Study, 2022, *GIS Specialist*

GIS Specialist for discovery and vision planning on Sound Transit's enterprise GIS; from licensing and system architecture planning to end-user technology identification and adoption consultation. Visionary planning and future return on investment for GIS projects and software solutions including GIS, CAD/3D Building Information Model (BIM), LRS design, and other existing systems as they relate to the operations of one of the largest transit agencies in the United States.

OTHER PROFESSIONAL EXPERIENCE

GIS Specialist
Steigerwaldt Land Services
- Creation of map digital and hard copy products for the various departments at SLS
- Maintenance, administration, and oversight of server and cloud-based network of GIS data.
- Developed cloud-based products for office and field use on ESRI's ArcGIS platform

GIS Specialist
Northwest Regional Planning Commission
- Development of various map products for public sector clients
- Data creation, maintenance and analysis
- Database design and administration
- Responsible for procurement, project estimation, budgeting, and grant-writing

Resume: Luke Winter, Solutions Engineer

Years of experience: 7

Education: MS, Geographic Information Science- University of Denver
BA, Computer and Information Systems- SUNY Polytechnic Institute

Overview:

Luke Winters is a Solutions Engineer for 1Spaital Inc. He has experience assisting various customers create innovative solutions leveraging the 1Spatial software platform. Luke specializes in solutions utilities, transportation, and facilities management verticals. Some of his key solutions include validating, enhancing, and inferring utility data to smooth the transition to the ESRI Utility Network, configuration of transportation networks, and cross-source validation of Computer Aided Design (CAD) and Building Information Management (BIM) data.

Work History:

- 2020 – Present: 1Spatial, Solutions Engineer
- 2019 – 2020: Critigen, GIS Analyst Intern
- 2018 – 2020: University of Denver, Graduate Teaching Assistant

Relevant Project Experience:

City of Irving, TX Utility Network Migration (2024)
Luke is the UN Migration Advisor for the City of Irving's Utility Network migration project. He is assisting in training, workshops, and technical decisions related to the migration of the city's water, stormwater, and sewer networks to Esri's Utility Network model. He advises on use of 1Spatial's UN Readiness, Migration, and Validation apps, as well as customizations and downstream impacts of changes to the UN foundation models for the project.

Holland, MI Board of Public Works Utility Network Migration (2024)
Luke served as the technical lead, assisting Holland Board of Public Works (BPW) migrate their electric network from the Geometric Network to the ESRI Utility Network. He consulted on data quality issues using 1Spatial's UN Readiness and UN Validations apps, including training and workshops with Holland BPW.

CoServ Utility Network Migration Pilot (2021-2022)
Luke served as the technical lead migrating from the Geometric Network to the ESRI Utility Network in the gas and electric distribution domains. He configured pre- and post-validations for geometry, attributes, and topology, aligning them with the Utility Network foundation models. Additionally, Luke coordinated workshops with customer subject matter experts to address schema transformation and connectivity rules, while also adjusting foundational models to facilitate third-party integrations.

ENWL Utility Network Readiness Assessment (2021-2022)
Luke supported 1Spatial's UK office in conducting a readiness assessment for an electric transmission network transitioning to the Utility Network. His responsibilities included authoring rules based on specific client requests and configuring a topology-based network connectivity validation and inference workflow.

Utilities, Transportation Solutions Engineer (2020-Present)

Luke works with utility and state and federal transportation customers to enable automated data management workflows for data validation, integration, and enhancements. He customizes implementation of data management (validation, attribute generalization, change detection, integration, submission) processes for various 1Integrate/1Data Gateway capability demonstrations including utility and transportation use cases. Builds rules and actions to generate sample results in meeting specific proof-of-concept type requirements. He updates solutions to remain current with industry trends and standards, including the ESRI Utility Network model.

Resume: Matthew Whittle, Senior Consultant

Years of experience: 11

Education: Bachelors of Science in Biology- University of Alabama-Huntsville

Overview:

Matthew is a Senior Consultant with 1Spatial Inc. with experience in GIS and 1Integrate. Matthew has worked on numerous projects focused on emergency services, positional accuracy improvement and validation. Matthew's academic training in both geography and computer science positions him well to support our customers. Matthew brings our team a broad breath of technical experience working with geospatial quality initiatives. He has consultant experience for multiple organizations including Verizon and Google.

Matthew is a highly skilled GIS Analyst with a robust background in telecoms, demonstrated through impactful positions at 3-GIS. Excelled in implementing, troubleshooting, and enhancing GIS solutions, leveraging expertise in ESRI software, Python scripting, and database management. Proven ability to communicate technical solutions effectively, showcasing leadership and technical prowess in optimizing GIS architectures and workflows.

Previous Relevant Experience:

1Spatial Inc.

Senior Consultant (2024 - Present)

- Investigate and correct automated TMC to HPMS linear data conflation procedures.
- Deploy business rules to validate customer data quality and identify needed improvements.
- Migrate utilities customer from legacy data to UN.
- Refine migration procedures to accelerate cutover time for UN customers.

3-GIS

Solutions Engineer III (2021 - 2024)

- Performed implementation, configuration, upgrades, and performance tuning services for 3-GIS Network Solution, Esri, web services, and database software on multiple server configurations and architectures, including cloud-based solutions.
- Diagnosed client issues with Windows Server, IIS, ESRI GIS software, 3-GIS solutions and user workflows.
- Troubleshot the 3-GIS software ecosystem (Web application, ArcGIS Server, Database, networking).
- Hands-on experience in command-line interfaces, RESTful APIs, and analyzing HTTP request/response in a browser's web inspector.
- Expertise in conducting brainstorming sessions and communicating technical solutions directly with clients and recommend enhancements to our product teams.
- Performed database analysis and implement corrective actions.
- Worked in collaboration with sales, product, implementation, and customer support teams.

Norfolk Southern
GIS Analyst (2022 - 2024)

- Performed a variety of GIS tasks across database, server, and desktop environments in Oracle and ESRI.
- Assisted GIS team to provide map services and applications to the enterprise through ongoing configuration, modification, and maintenance of Oracle Spatial and ESRI's ArcGIS Server.
- Worked with internal Business Partners and other IT teams to develop use cases and requirements for potential new projects and applications.
- Supported the systematic testing and debugging of new and enhanced applications.
- Documented GIS procedures, applications details, user instructions, and other necessary communications as required.

3-GIS
Solutions Engineer II (2015 - 2021)

- Converted Tier 1, 2, 3, and ISP customer data from legacy source to Enterprise GDB.
- Wrote Python ETL solutions to perform GIS operations and data migrations.
- Created logical data solution to repair signal connectivity issues inside all Verizon markets within their Production environment.
- Conducted testing on all software products utilizing systems analysis techniques and procedures.
- Developed software test plans for future regression workflows.

National Forest Service
Volunteer Field Associate (2014)

- Performed eldwork techniques to measure tree growth, population density, forest fuel capacity, and canopy exposure.
- Assisted eld technicians with GPS equipment and data acquisition.

Appendix C: Required Forms

The following are the required forms that were included in the RFP.

RFP Acknowledgement and Signature Form

RFP No.: 25-21, Utility Network Vendor Selection

The undersigned having carefully examined the location of the proposed work, the local conditions of the place where the work is to be done, the Invitation, the General Conditions, the Specifications and all of the documents for this project, proposes to enter into a contract with Greenville Utilities Commission in Greenville North Carolina perform the work listed in this RFP, including all of its component parts, and to furnish any and all required labor, materials, equipment, insurance, bonding, taxes, transportation and services required for this project in strict conformity with the plans and specifications prepared, including any Addenda, within the time specified.

Addendum Acknowledgement:

The following addendum (addenda) is (are) acknowledged in this RFP: CGS Acknowledges ALL addenda

Acknowledgement and Signature:

1. No Proposal is valid unless signed in ink by the person authorized to make the proposal.
2. I have carefully read, understand and agree to the terms and conditions on all pages of this RFP. The undersigned agrees to furnish the services stipulated in this RFP.

Respondent's Name and Title:

Company Name: Cultivate Geospatial Solutions, LLC

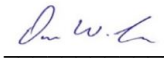
Address: 3500 Depauw Blvd, Suite 10815, Indianapolis, IN 46268

Telephone: (513) 600-1316 Fax: _____

Email: dlynch@cultivategeospatial.com Cell Number: (513) 600-1316

Contractor License # (if applicable): _____ Expiration Date: _____

Federal Tax Identification Number: 85-2771504

Authorized Signature:  Date: 5/13/25

Decline RFP:

We **do not** wish to submit an RFP on this Project. Please state your reason below. Please also indicate if you would like to remain on our Supplier list.

Reason: _____

_____

_____

Company: _____ Address: _____

Name: _____ Signature: _____ Date: _____

E-Verify Form

Letter of Compliance to E-Verify for Greenville Utilities Commission. Please complete the form below.

1. 1.I have submitted a bid for contract or desire to enter into a contract with the Greenville Utilities Commission;
2. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that I am aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
3. Yes After hiring an employee to work in the United States I verify the work authorization of said employee through E-Verify and retain the record of the verification of work authorization while the employee is employed and for one year thereafter; or
4. Yes I employ less than twenty-five (25) employees in the State of North Carolina.
5. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that to the best of my knowledge and subcontractors employed as a part of this bid and/or contract, are in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
6. Yes After hiring an employee to work in the United States the subcontractor verifies the work authorization of said employee through E-Verify and retains the record of the verification of work authorization while the employee is employed and for one year thereafter; or
7. Yes Employ less than twenty-five (25) employees in the State of North Carolina.

Specify subcontractor: 1Spatial

Cultivate Geospatial Solutions, LLC (Company Name)

By: Douglas Lynch (Typed Name)

(Authorized Signatory)

Principal, Owner (Title)

5/13/25 (Date)

It is certified that this proposal is made in good faith and without collusion or connection with any other person bidding on the same above listed items. It is also certified that this proposal is made in good faith and without collusion or connection with any GUC employee(s).

Certified check or cash for N/A or bid bond for N/A attached.

Firm Name: Cultivate Geospatial Solutions, LLC Phone: (513) 600-1316

Address: 3500 Depauw Blvd, Suite 10815, Indianapolis, IN 46268

City Indianapolis State IN Zip Code 46268

Fax (____)_____ E-mail dlynch@cultivategeospatial.com

Authorized Official Douglas Lynch Title Principal, Owner
Typed Name

_____ Date 5/13/25

Your Proposal should be received no later than Mayl 13, 2025, 3:00PM (EDT)

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 06/26/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATIONIS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER O'NEIL LEE & WEST INC 21220465 408 E RIDGEWOOD STREET ORLANDO FL 32803	**CONTACT NAME:** **PHONE (A/C, No, Ext):** (407) 425-3411 **FAX (A/C, No):** **E-MAIL ADDRESS:**
INSURED CULTIVATE GEOSPATIAL SOLUTIONS 3500 DEPAUW BLVD STE 10815 INDIANAPOLIS IN 46268	**INSURER(S) AFFORDING COVERAGE** — **NAIC#** **INSURER A :** Hartford Underwriters Insurance Company — 30104 **INSURER B :** Hartford Fire and Its P&C Affiliates — 00914 **INSURER C :** **INSURER D :** **INSURER E :** **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED.NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/Y YY)	LIMITS	
A	COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR [X] General Liability GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [ ] PRO-JECT [X] LOC OTHER:	X		21 SBM AT3G8V	07/25/2024	07/25/2025	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $1,000,000 $10,000 $1,000,000 $2,000,000 $2,000,000
A	**AUTOMOBILE LIABILITY** ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS [X] HIRED AUTOS [X] NON-OWNED AUTOS			21 SBM AT3G8V	07/25/2024	07/25/2025	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000
A	[X] **UMBRELLA LIAB** [X] OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION $ 10,000			21 SBM AT3G8V	07/25/2024	07/25/2025	EACH OCCURRENCE AGGREGATE	$2,000,000 $2,000,000
B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? **Y/N** [ ] **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N/ A		21 WEC AT3GAY	07/25/2024	07/25/2025	[X] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE -EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
A	Employment Practices Liability Insurance			21 SBM AT3G8V	07/25/2024	07/25/2025	Each Claim Limit Annual Aggregate Limit	$25,000 $25,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES **(ACORD 101, Additional Remarks Schedule, may be attached if more space is required)**

Those usual to the Insured's Operations.

CERTIFICATE HOLDER

City of Greenville, NC

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Susan L. Castaneda