December 5, 2024

# Response to RFP DNR250000001

Response to **Request for Proposal**

*West Virginia Division of Natural Resources*

*Wildlife Resources Section*

***Custom Database Application***, **RFP DNR250000001**

*Submitted by:*

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**Requesting Consideration as Minority-Owned Business Enterprise**

**(Registration Enclosed)**

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## Solution Proposal

Wavicle Data Solutions (Wavicle) enthusiastically presents this proposal to develop the solution meeting SECTION's needs for a Custom Database Application. The 2021 Data Systems Assessment, Final Report Broadsheets, and Appendices were extremely helpful in providing the context for our proposal, which we believe you will find to be a compelling project approach and partnership opportunity.

Wavicle understands the data management, reporting, and analysis challenges of the Wildlife Resources Section (SECTION) within the West Virginia Division of Natural Resources (DIVISION). Many organizations we work with have recognized the need to modernize their data ecosystem that was originally built from siloed Excel spreadsheets and Access databases. Evolving the data ecosystem to improve trust and transparency, usability, data literacy, self-service, collaboration, resiliency, interoperability, appropriate access, and security is the crux of the services Wavicle provides to the market.

## Goals and Objectives

Wavicle's solution will provide a single, unified, cloud-based database application to support the many stakeholders of SECTION data as they collaborate and utilize the data with business intelligence, visualization, statistical, GIS, and other tools. The solution will be designed and implemented with ease of use and flexibility in mind, using an agile methodology and SECTION's prioritization of needs. The agile approach allows stakeholders to be part of the process and try things out as they are built rather than having a "big bang" implementation with lengthy training requirements.

Having one integrated system for that allows for data collection as well as linkages across SECTION data will support knowledge-sharing and accessibility to data sources that have been siloed in the past. Stakeholders of this data will have lower frustration levels with versioning and finding data assets so they can focus on analysis and producing trusted insights in various tools (both directly and via export).

Data privacy and security will also be enhanced so that consumers, editors, and owners have the right access to the right data at the right time using the right method. Auditing of all usage and notifications based on problems will be new capabilities with this solution as well.

Data governance, data literacy, and culture are important aspects to consider. Our proposal will incorporate the pieces critical to success and not just focus on the technical implementation. A new system or database is only beneficial if people can and will use it. Understanding how and especially "why" culture, change management, data literacy and fluency, data lifecycle management, and data ownership contribute to

satisfied users and stakeholders will go a long way toward support for the new system within SECTION.

# Cloud Platform Selection

Given the State of West Virginia's investment in Google Workspaces and references to the future environment with Google tools, we have made the assumption that the custom cloud database application you seek will be based on Google Cloud Platform (GCP), and perhaps specifically Google Public Sector. Please recognize that Wavicle is vendor-agnostic and would be fully capable of implementing this solution on either the Microsoft Azure (Azure) or Amazon Web Services (AWS) cloud platform as well.

If a cloud platform other than GCP is desired, the names of the services and tools would change, but the core architecture and solution approach would be the same; cloud operating costs would be similar between the platforms as well. Additionally, we have shared two architecture options and their trade-offs because we see value in developing a platform-agnostic solution (for flexibility and future portability) but also recognize that there are benefits in ease of maintenance for a GCP-specific solution. We are happy to discuss these items further during the oral presentations or the Discovery & Analysis phase.

# Solution Hosting

We understand the RFP asks for solution hosting services to be provided by the Vendor, but Wavicle would prefer that SECTION obtain its own subscription, or use DIVISION's or West Virginia Office of Technology (WVOT's) subscription, for the solution. The ability to subscribe to a Platform-as-a-Service (PaaS) on Google Cloud Platform (GCP) gives SECTION (or DIVISION or the West Virginia Office of Technology) the autonomy to use other services for other needs, the economies of scale for discounts, any Google Public Sector discounts and benefits, and tighter integration with Google Workspaces and Google Identity and Access Management for user provisioning, authentication, and authorization. Whether the selected cloud platform is Google or another provider, Wavicle would be happy to assist via our partnerships with the cloud vendors if needed to make this happen.

With this approach, Wavicle will provide estimated cloud hosting costs that SECTION (or related agency) would pay directly to the cloud provider. Wavicle would also help provision any cloud services needed to implement the solution and ensure that it is fully integrated with the PaaS subscription. Additionally, cloud engineering support (labor) is included during the project and while Wavicle is contracted to support the solution.

# Project Approach and Methodology

## Organizing For Delivery

Agile methodology affords the most flexibility, an incremental and iterative approach, and gets to solution release more quickly. Prioritization of features and functionality is not stuck in an requirements analysis phase; instead, it can be adjusted based on learnings during the project, shifting priorities, and best information available. Without diving into an exhaustive description of agile methodology, highlights for success are described here.

For agile delivery, Wavicle finds that the "pod" approach plus a shared services platform team works best. Each pod has a mix of resources to independently complete business analysis, development, and testing for an area of functionality.

## Wavicle Resources

Given the scope of the work for the solution, two pods will be sufficient to complete the majority of the work in 12 months. Each of the two pods would focus on two units within SECTION. Pods would be comprised of Data Engineering, Fullstack Development, Front-End Development, BI Engineering, Scrum Master, QA, and Business/Technical Analyst capabilities. Resources may fill more than one role within the pod.

The shared services platform team will contain capabilities of Cloud and Security Engineering, DevOps, Data Architect/Modeling, and UX Design. Similar to the pod composition, resources may fill more than one role on the platform team.

Additional skills and experience will be part of the team, including Executive Sponsorship, Engagement/Program Management, Solution Architecture, Natural Resources, Wildlife/Fish/Game, ArcGIS, Test Planning and Coordination, Data Governance, Training, and Organizational Change Management.

## SECTION Resources

Successful implementation is based on participation with SECTION (and related groups, in some cases) in the areas of Executive Sponsorship, Product Ownership, Data and Process Subject Matter Expertise, Data Validation, User Acceptance Testing, Superusers, Communication and Logistics, System Access, Privacy and Security, and Data Governance. Although this list appears lengthy, quality is emphasized over quantity of time and effort spent.

The agile approach requires SECTION play an active role in Product Ownership to ensure the solution (product) meets the needs of SECTION. Features and functionality are managed through epics and stories in a product backlog. This allows SECTION

immense flexibility as needs evolve and priorities change, but with that comes great responsibility.

On a quarterly basis, the "big rocks" (epics) for the solution are identified. Ideally, the "big rocks" for a quarter are selected to results in a release of the solution after the quarter ends (instead of waiting for everything in the solution to be completed). From there, a backlog of user stories needs to be groomed (objectives, features, success criteria) and prioritized to guide the team's work in each sprint of the quarter. Grooming the backlog (developing and prioritizing stories) is an ongoing activity that must be done by SECTION, supported by the Wavicle team. Having one Product Owner for the solution or a Product Owner for each unit is a decision that can be determined during Discovery & Analysis, but it is important to have clear direction to keep momentum and focus during sprints.

## Proposed Schedule

Upon review of the specifications in the RFP, the SECTION objectives, and the 2021 Data Systems Assessment Final Report, Wavicle is pleased to share that we will be able to implement the solution during the first 12 months of the project. Months 13-24 would be covered by a smaller support team that would spend their time fixing any identified defects, optimizing the platform, developing prioritized solution enhancements, and perhaps even addressing requirements that may have been previously de-prioritized. A schedule for the two-year term identified in the RFP is provided as a starting point for discussion.
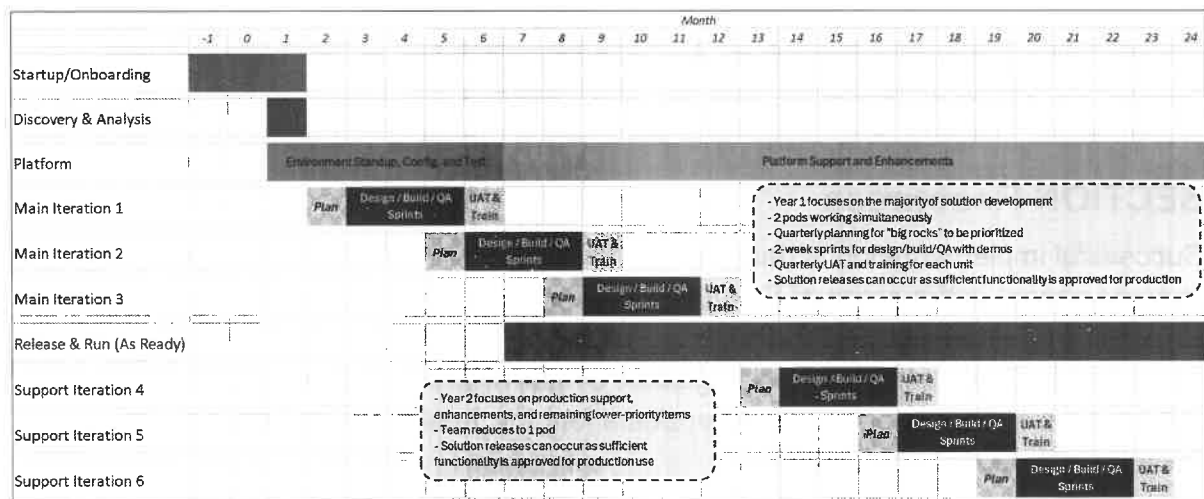
## Solution Overview

Wavicle proposes the development of a single, unified cloud-based application for the SECTION that can be accessed via desktops, laptops, and mobile devices (including smartphones) for data collection and analysis.

The integrated database supporting this solution would include data linking, as appropriate, between datasets found in Microsoft Access databases and Excel spreadsheets today. It would also support data linking with external datasets, systems, and tools such as ArcGIS, Biotics, the Electronic Licensing System replicated database, and others.

Analysis and reporting from this data accessible via multiple tools, from Google Suite tools to BI applications (e.g., Tableau, PowerBI, Google Looker) to ArcGIS and R. Both online analysis and offline analysis would be possible, and guidelines would be co-developed by Wavicle and SECTION around personas and use cases for different tools as well as direct access vs export (for offline analysis) to optimize performance, processing costs, and training/skills needs.

Wavicle is sharing two different architectural approaches for further discussion during the oral presentations or during the discovery and analysis phase at the beginning of the project. These two options will be referred to as the **Serverless Approach** and the **Server-Based Approach**. Diagrams and supporting information are provided for both, and a comparison of the two approaches is provided afterward.

*Note:* The decision of Serverless or Server-Based Architecture can be made during Discovery & Analysis based on SECTION's priorities and the tradeoffs that each offers.

## Serverless Architecture



Architecture: CUSTOM DATABASE APPLICATION (Cloud Functions Microservice)
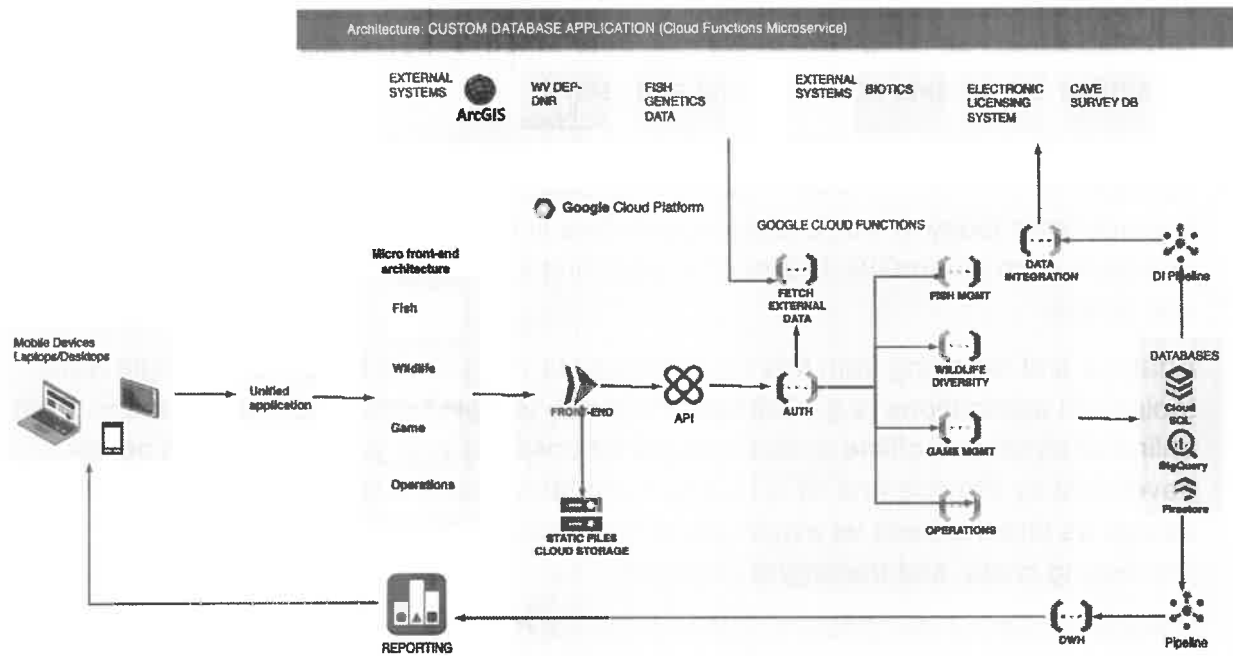
## Serverless Architecture Overview:

- Frontend Hosting:
  - Use Firebase Hosting or Cloud Storage with Cloud CDN to host static assets like HTML, CSS, and JavaScript.
  - Firebase Hosting offers seamless integration with modern frameworks like React.
- Backend API:
  - Use Cloud Functions or Cloud Run to handle backend logic:
  - Cloud Functions: Event-driven, great for lightweight API endpoints.
  - Cloud Run: Run containerized applications, supporting more complex workloads or custom runtimes.
- Database:
  - Use Firestore (NoSQL) or Cloud SQL (relational):
    - Firestore is serverless and scales automatically. An intermediate storage for handling push events from offline devices when they go online.
    - Cloud SQL is better for structured relational data.
    - BigQuery to analyze behavioral patterns, trends, or metrics. Integrate and enrich application's data with public datasets in BigQuery (e.g., demographic data, weather data).
- Authentication:
  - Use Firebase Authentication/ SSO/Google Identity for managing users with minimal setup.
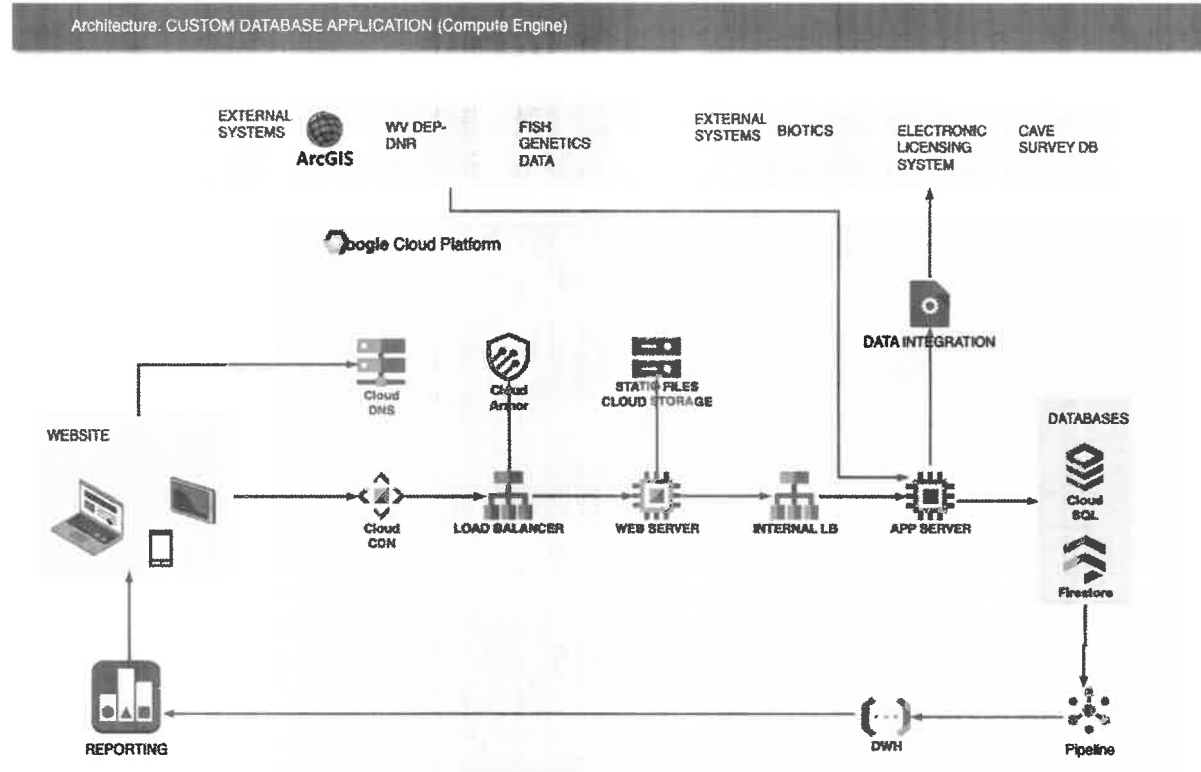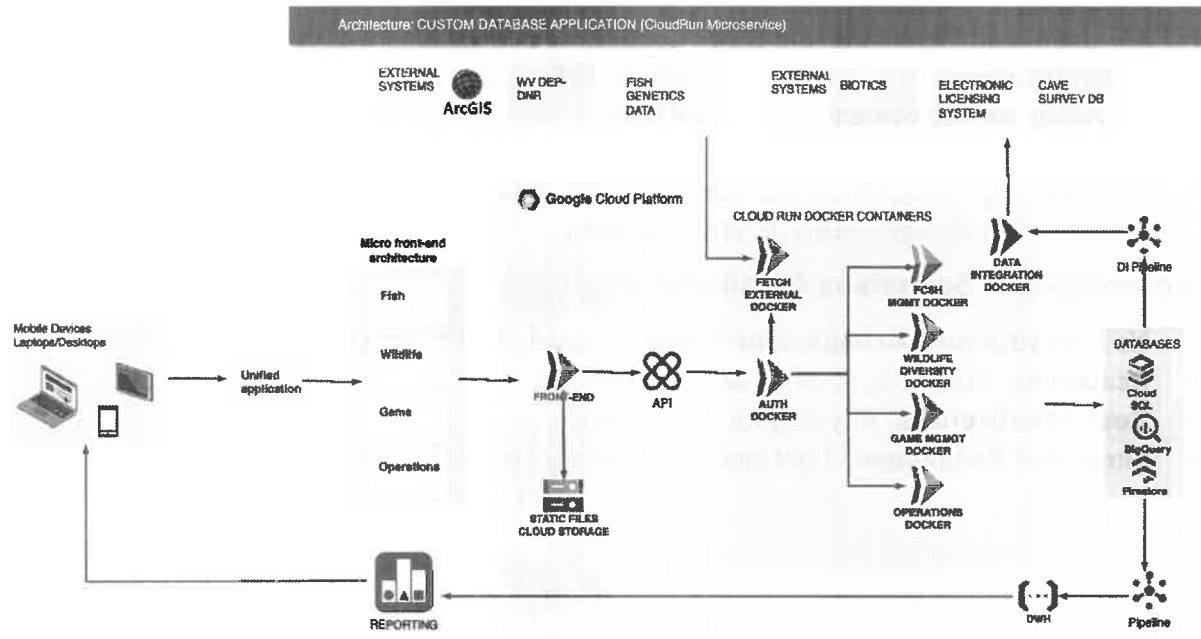- Cloud Storage:

8

- o Store files (e.g., images, videos) using Google Cloud Storage.
- Monitoring and Logging:
  - o Use Cloud Monitoring and Cloud Logging for application insights.
- CI/CD Pipelines:
  - o Automate deployments with Cloud Build.
- Reporting:
  - o Reporting through tools like Google Looker, Power BI, Tableau.
  - o Reporting through React JS graph libraries.

## Advantages of Serverless Architecture:

- **No Infrastructure Management:** Focus on development, not servers.
- **Scalability:** Automatic scaling based on demand.
- **Cost-Effectiveness:** Pay only for what you use.
- **Integrated Ecosystem:** Tight integration across Google services like AI/ML APIs.

# Server-Based Architecture



Architecture: CUSTOM DATABASE APPLICATION (CloudRun Microservice)



Architecture. CUSTOM DATABASE APPLICATION (Compute Engine)

## Server-Based Architecture Overview

Building a web application on **Google Cloud** using **Google Compute Engine (GCE)** involves using virtual machines (VMs) to host your application. This approach provides more control over the infrastructure compared to serverless solutions.

- The VMs will have Docker containers for each of the microservices like Fish Management, Game Management etc.
- The VM size (Memory / disk) can be determined during discovery phase, but with the details provided, 16 GB RAM / 80 GB disk space is a good choice which can be scaled vertically.
- No single point of failure for the application.

  1. Frontend:
     - Static or dynamic frontend hosted on a web server (e.g., Apache, Nginx) running on a GCE instance.
     - Optionally use a CDN (Cloud CDN) for faster content delivery. *[Preferred]*
  2. Backend:
     - Application logic implemented in your preferred framework or runtime (Node.js, Python/Django, Java/Spring, etc.).
     - Hosted on one or more GCE instances.
  3. Database:
     - *Cloud SQL* for managed relational databases (MySQL/PostgreSQL/SQL Server) for structured relational data.
     - *Cloud Spanner* or *Firestore* for NoSQL solutions. An intermediate storage for handling push events from offline devices when they go online.
     - BigQuery to analyze behavioral patterns, trends, or metrics. Integrate and enrich application's data with public datasets in BigQuery (e.g., demographic data, weather data).
  4. Load Balancing:
     - Use *Cloud Load Balancing* to distribute traffic across instances for high availability.
  5. Monitoring and Logging:
     - Use *Cloud Monitoring* and *Cloud Logging* to monitor performance and troubleshoot issues.
  6. Reporting:
     - Reporting through tools like Google Looker, Power BI, Tableau.
     - Reporting through React JS graph libraries.

## Advantages of Server-Based Approach:

1. **Customization**: Full control over the stack.
2. **Hybrid Workloads**: Suitable for running legacy applications.
3. **Performance**: Select VM types tailored to your app's needs.
4. **Scalability**: Manual or automatic scaling based on demand.
5. **Portability**: Easily portable to other cloud services as there is no dependency on underlying infrastructure with containerized solution.

## Comparison of Serverless and Server-Based Architectures

| Feature | Serverless Approach | Server-Based Approach |
|---|---|---|
| Infrastructure Management | • No server management or OS maintenance<br>• Automatically scales based on demand<br>• Abstracts away infrastructure, focusing only on code and logic | • Full control over the underlying infrastructure<br>• You are responsible for OS updates, scaling, and application hosting configurations<br>• Requires more operational expertise |
| Scalability | • Auto-scales instantly to handle traffic spikes<br>• You pay only for the time your code runs | • Can be scaled manually or using autoscaling configurations<br>• Scaling may be slower and could require pre-configured instance templates |
| Cost | • Pay-per-use model: costs are based on executions, memory, and runtime duration<br>• Cost-effective for low to moderate usage or unpredictable workloads | • Pay for the VM instance uptime, even if underutilized<br>• Costs increase with high resource allocation or unused capacity |
| Development Speed | • Faster to deploy and manage<br>• Built-in integrations with Google Cloud services like Firestore and Pub/Sub<br>• Ideal for modern, microservices-based architectures | • Requires more setup time for VM creation, OS installation, and environment configuration<br>• Better for hosting traditional monolithic applications |
| Flexibility | • Limited control over infrastructure and runtime environments<br>• Works well with stateless, event-driven architectures | • Full control over the environment, including OS, runtime, middleware, and network configurations<br>• Suitable for stateful applications or complex deployments |
| Supported Workloads | • Lightweight, event-driven workloads<br>• Microservices, APIs, data processing, or lightweight backends | • Any workload, including heavy computations, custom runtimes, and legacy systems |
| Portability | • Tightly coupled with Google function, can be moved to other | • Loosely coupled with underlying cloud vendor, can easily be |

| | cloud service with adjustments (e.g., Azure Function App, AWS Lambda) | | migrated and hosted in any cloud service |
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# Mandatory Project Requirements

Wavicle's solution can meet all of the mandatory project requirements. The solution described within this proposal has been crafted based on the mandatory and non-mandatory specifications in the Request for Proposal.

| Reqt | Specification | A | B |
|---|---|---|---|
| 4.2.2.1 | Does your solution provide the ability to collect and process natural resources and environmental data? | Yes | Our solution would stand up a cloud platform on GCP that would allow for the scalable ingestion and storage of all SECTION data, as well as SECTION-wide analysis and visualization in a secure, cost efficient, and effective manner:<br><br>**Data Ingestion and Storage:**<br><br>• *Cloud Storage:* For storing all SECTION relevant data. This provides a scalable and durable repository for SECTION data including, but not limited to:<br>    ○ Specimen Data<br>    ○ Instrument Data<br>    ○ Monitoring data<br>    ○ Cooperator Survey Responses<br>    ○ Classification Data<br>    ○ Geospatial Data<br>    ○ Harvest Records<br>    ○ Stocking Records<br>    ○ Misc Datasets<br>    ○ Secondary Analysis<br>• Our solution leverages Google's BigQuery for ingestion and storage of SECTION data. BigQuery provides direct integration with key DNR systems including ArcGIS, enabling users across the department to access the organization's data in a secure and scalable manner.<br><br>• Our solution leverages Google's BigQuery for ingestion and storage of SECTION data. BigQuery provides direct integration with key DNR systems including ArcGIS, enabling users across the department to access DNR staff members to access the organization's |

data in a secure and scalable manner.

- *Cloud SQL:* Google Cloud SQL is a relational database for storing and analyzing structured environmental data (e.g., sensor and geospatial data)

- *Google Earth Engine:* Though not built into our initial solution as it's not necessary to meet DNR's current requirements, our solution's architecture provides the foundation for the DNR to add Google Earth Engine capabilities in the future to augment the capabilities currently existing with ArcGIS and other DNR technologies. For massive geospatial datasets, especially satellite imagery and environmental data, Google Earth Engine handles data ingestion, processing, and analysis at a planetary scale. It enables real-time data ingestion and updates with IoT Integration, rapid data synchronization, and quick response to environmental events.

**Data Processing and Analysis:**

- *Firestore:* Google Firestore, a NoSQL cloud database, is a scalable, flexible solution for storing, organizing, and querying DNR data. It's real-time capabilities and scalable architecture make it an ideal tool for supporting mobile applications with user requirements like those of the DNR. Firestore allows for custom data models that meet DNR requirements and rapid data synchronization across the organization.
- *BigQuery:* BigQuery's analytical tools, native BigQuery Machine Learning (allowing for the creation of machine learning models with GoogleSQL queries), and scalable serverless data storage allows for the democratized, secure analysis of all DNR data. In addition, BigQuery's integration with ArcGIS allows for the analysis and visualization of geospatial data using geography data types and GoogleSQL geography functions.
- *Dataproc:* For more complex data

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| | | | processing, Dataproc runs distributed processing frameworks like Apache Spark. This allows for advanced analytics and machine learning built on SECTION data.<br><br>**Data Visualization and Sharing:**<br>• *Looker:* Looker connected to BigQuery enables interactive dashboards and visualizations of geospatial data, user data, and all image data. This enables users to explore and understand the data in a user-friendly way. Looker also serves as a enterprise-wide semantic layer that allows for governed access to data at the individual / role level.<br>• *Cloud Run:* Cloud Run allows for the development and deployment of web and mobile applications that provide users with access to processed data and analysis results. |
| 4.2.2.2 | Does your solution centralize data storage and management, utilizing relational database design to establish links between related datasets? | Yes | Our solution leverages GCP's technologies to centralize data storage and management. Specifically, BigQuery serves as the relational database that establishes links between related datasets. Looker not only enables data analytics and visualization, but also provides a centrally governed semantic data layer that makes data available to all users and downstream applications (including applications not hosted on the SECTION's Google VPC, via API).<br><br>**BigQuery as the Centralized Data Store:**<br><br>• **Scalable and cost-effective storage:** BigQuery provides a scalable and cost-effective solution for storing all enterprise data, including structured, semi-structured, and unstructured data, in a single data warehouse.<br>• **Data consolidation:** It can ingest data from various sources, including existing relational databases, cloud applications, and streaming data. This allows the SECTION to consolidate all your data into one central repository.<br>• **Geospatial capabilities:** As we discussed earlier, BigQuery integration with ArcGIS provides scalable, secure capability for storing, processing, and |

analyzing SECTION's georeference data.

**Looker as the Centralized Data Analysis and Exploration Platform:**

- **Unified view of data:** Looker connects to BigQuery and provides a single platform for all your data analysis and exploration needs.
- **Semantic modeling (LookML):** Looker uses a powerful modeling language called LookML to create a consistent and governed view of SECTION's enterprise data. This ensures everyone across the organization works with the same definitions and metrics.
- **Data governance and security:** Looker allows SECTION to implement robust data governance policies and control access to sensitive data within BigQuery and your cloud environment more generally.

Both BigQuery and Looker can link with other relational databases:

- **BigQuery:**
  - *Federated Queries:* BigQuery can query data directly from external databases like Cloud SQL (MySQL, PostgreSQL, SQL Server) without needing to import the data.
  - *Data Transfer Service:* Leverage BigQuery's Data Transfer Service to schedule and automate data imports from other relational databases into BigQuery.
- **Looker:**
  - *Database Connectors:* Looker provides connectors to a wide range of databases, including MySQL, PostgreSQL, SQL Server, Oracle, and many others. This allows SECTION to analyze data from multiple sources within a single Looker project.

In addition to BigQuery and Looker, our solution can also leverage Google's *Firestore for governed, high*-throughput data access. Firestore allows for the management and storage of unstructured data and is optimized for high performance read and writes. Like BigQuery, Firestore can be integrated with relational databases to create a hybrid data

| | | | architecture. |
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| | | | Our team's solution brings our deep knowledge of scalable data architectures together with GCP's capabilities to ensure effective data management and storage for SECTION. |
| 4.2.2.3 | Does your solution allow for improvements and expansion as staff and partners require greater data capturing capabilities? Is your solution adaptable as projects and needs change? | Yes | Our solution will leverage best practices in modularity, flexibility, and scalability across GCP and other cloud-based services. We will build with the end in mind, ensuring the SECTION has the capabilities to scale up data capturing and governance in the future.<br><br>Our modular based approach leveraging cloud native services will also allow for the SECTION to quickly develop and scale up future projects as needs change. |
| 4.2.2.5 | Does your solution create user accounts and secure logins with a unique ID? | Yes | Our solution leverages GCP's Identity and Access Management (IAM) capabilities to manage user accounts and control data access across SECTION's cloud data platform. These capabilities include:<br><br>**User Account Management:**<br><br>• *User Creation:* IAM allows SECTION to create and manage user accounts for individuals who need access to Google Cloud resources.<br>• *User Roles:* SECTION admin staff can assign specific roles to users, granting them different levels of access to resources. These roles are based on the principle of least privilege, ensuring that users only have the necessary permissions to perform their tasks.<br>• *Organization Hierarchy:* IAM supports hierarchical organizations, allowing SECTION to group users and resources into organizational units. This makes it easier to manage access control at scale.<br><br>**Secure Data Access:**<br><br>• *Resource-Based Access Control (RBAC):* IAM enables SECTION admins to define fine-grained access control policies for individual resources, such as Compute Engine instances, Cloud Storage buckets, and BigQuery datasets. SECTION can specify which users or groups can |

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|  |  |  | perform specific actions on these resources.<br>• *Role-Based Access Control (RBAC):* IAM provides a flexible RBAC model that allows SECTION to create custom roles with specific permissions. This enables SECTION to tailor access control to your organization's specific needs.<br>• *Conditional Access:* IAM supports conditional access, which allows SECTION to enforce additional security requirements, such as device posture checks, multi-factor authentication, and IP address restrictions.<br>• *Audit Logging:* IAM provides detailed audit logs that record all user activity, including access attempts, resource modifications, and policy changes. This helps you monitor and investigate security incidents.<br><br>**Benefits of Our Approach with GCP IAM:**<br><br>• **Enhanced Security:** IAM helps protect SECTION data by limiting access to authorized users and enforcing strong security policies.<br>• **Improved Efficiency:** IAM simplifies user management and access control, reducing administrative overhead.<br>• **Increased Compliance:** IAM helps SECTION comply with relevant regulations by providing granular control over data access and auditing user activity.<br>• **Scalability:** IAM can scale to support a large organization like SECTION with complex access control requirements.<br><br>Our approach to implementing IAM will establish a robust security posture and ensure that SECTION data is protected and accessible only to authorized individuals. |
| --- | --- | --- | --- |
| 4.2.2.4 | Does your solution implement a versioning process utilizing one central relational database that all appropriate staff can access and edit? | Yes | Our solution leverages a comprehensive solution on GCP leveraging both BigQuery and Looker to provide a powerful and secure solution for data management, analysis, and access. |

This is accomplished with both tools as follows:

**BigQuery: Data Versioning and Access Control**

1. *Table Snapshots:* BigQuery allows SECTION to create table snapshots, which are essentially point-in-time copies of a table. This enables the user to query historical data, ensuring data integrity and reproducibility of analyses.

2. *Partitioning:* By partitioning tables based on time and other relevant dimensions, SECTION can efficiently query specific time periods or subsets of data, improving query performance and enabling time-based data versioning.

3. *Row-Level Security (RLS):* BigQuery RLS allows SECTION to restrict access to specific rows within a table based on user attributes or other conditions. This ensures that sensitive data is only accessible to authorized individuals.

4. *Column-Level Security (CLS):* CLS enables SECTION to mask or encrypt specific columns within a table, further enhancing data security.

5. *IAM Roles and Permissions:* Google Cloud's Identity and Access Management (IAM) system allows SECTION to define fine-grained access controls, granting specific permissions to different users and groups.

**Looker: Centralized Access and Governance**

- *Role-Based Access Control (RBAC):* Looker's RBAC system enables SECTION to define roles with specific permissions, such as viewing, editing, or creating dashboards and explores.

- *Data Model Security:* SECTION can implement data model security to restrict access to specific models, fields, and calculations.

- *User Permissions:* SECTION can assign specific permissions to individual users, controlling their access to data and analyses.

- *Data Exploration Controls:* Looker provides features to control data

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| | | | exploration, limiting the scope of analysis and preventing unauthorized access to sensitive data.<br>• *Audit Logs:* Looker's audit logs track user activity, including data access, modifications, and exports. This helps ensure compliance and identify potential security breaches. |
| 4.2.2.6 | Does your solution support clear permission levels, allowing for restriction of data from the public, group permissions, and graduated permission levels for data consumers (read-only), editors (read/write), and owners (read/write/create/delete)? | Yes | Our solution supports secure data access for consumers, editors, and owners with:<br><br>• *Resource-Based Access Control (RBAC):* IAM enables SECTION admins to define fine-grained access control policies for individual resources, such as Compute Engine instances, Cloud Storage buckets, and BigQuery datasets. SECTION can specify which users or groups can perform specific actions on these resources.<br>• *Role-Based Access Control (RBAC):* IAM provides a flexible RBAC model that allows SECTION to create custom roles (e.g., consumers, editors, owners) with specific permissions. This enables SECTION to tailor access control to your organization's specific needs.<br>• *Conditional Access:* IAM supports conditional access, which allows SECTION to enforce additional security requirements, such as device posture checks, multi-factor authentication, and IP address restrictions.<br>• *Audit Logging:* IAM provides detailed audit logs that record all user activity, including access attempts, resource modifications, and policy changes. This helps SECTION monitor and investigate security incidents. |
| 4.2.2.7 | Does your solution track both edits to the data and the person making an edit for transparency, accountability, and data integrity? | Yes | Our solution provides audit logging across the entire cloud data platform through IAM. IAM provides detailed audit logs that record all user activity, including access attempts, data edits, resource modifications, and policy changes. This helps SECTION monitor and investigate security incidents. |
| 4.2.2.8 | Does your solution incorporate design for self-service, with the ability for users to access | Yes | Self-service (data democratization) is a key component of our solution. Our cloud platform architecture and its supporting governance and process workflows will |

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| | data on their own within a permission-controlled environment? | | enable users at all levels of the organization to access the data they need when they need it.<br><br>Self-service analytics with Looker will also be a key outcome of our platform development. Security of access will be maintained as detailed in the questions above. |
| 4.2.2.9 | Does your solution allow for improving processes incrementally, applying an iterative approach to implementation? | Yes | Our solution will leverage best practices in modularity, flexibility, and scalability across GCP and other cloud-based services.<br><br>Our approach of using agile methodology will allow SECTION to improve processes incrementally and implement functionality the same way. The agile approach focuses on iterative, incremental development based on SECTION's priorities. Quarterly planning to identify the work that makes sense to implement together, along with 2-week sprints for implementation, will allow SECTION to determine when enough functionality is ready to deploy a release. Sprint retrospectives help the entire team improve project processes along the way too.<br><br>User acceptance testing and training in small chunks helps with buy-in and ensuring staff is ready for the change instead of deploying a whole new system at once with a massive training curriculum. Learnings along the way will be taken into account iteratively for the benefit of all. |
| 4.2.2.10 | Does your solution include recommendations for standard retention and end-of-life procedures for datasets, notifying owners as appropriate? | Yes | Critical aspects of data governance (beyond data privacy and security) to consider in relation to SECTION's new application include identifying owners of datasets, dataset stakeholders, and access and usage policies. Paired with these, data lifecycle management is a key process involving Creation, Storage, Usage, Sharing, Archiving, and Destroying of data. Data lifecycle management is a combination of technology, people, and processes.<br><br>Our team will work with SECTION to put in place end-to-end data lifecycle management and essential related data governance. Data lifecycle management supports optimizing data storage and processing costs. |

| 4.2.2.11 | Does your solution provide the user with accessible and easy to follow menus and directions? | Yes | The solution provided will be an easy to use intuitive GUI that provides menus and navigation directions to achieve end result. Solution will ensure the following:<br>• **Consistency**: Use familiar patterns and consistent layouts.<br>• **Clear Navigation**: Ensure menus are labeled clearly and easy to locate.<br>• **Keyboard Accessibility**: Menus should be operable via keyboard alone.<br>• **Readable Text**: Use sufficient contrast, legible fonts, and scalable text.<br>• **Screen Reader Support**: Include ARIA labels and semantic HTML to assist screen readers.<br>• **Simple Language**: Use plain language for directions and avoid jargon.<br>• **Error Prevention and Recovery**: Provide clear instructions to prevent errors and guidance on correcting them. |
| --- | --- | --- | --- |
| 4.2.2.12 | Does your solution support data conversion from legacy SECTION systems? Please detail the data conversion process; including, division of responsibilities between the SECTION and Vendor. See Attachment B: Wildlife Resources Section Data Systems Assessment for a listing of databases and recommendations for conversion. | Yes | Our solution will enable SECTION to land data from all legacy systems within the new architecture on GCP. The services available in GCP, along with Wavicle's experience and solution accelerators we bring to the table, underpin the solution to speed the implementation of the new scalable system that will be flexible for evolving needs.<br><br>**Data Conversion Process:**<br>1. Land Legacy Data (in Development environment)<br>2. Discovery & Analysis (legacy sources)<br>3. Data Modeling<br>4. Data Mapping<br>5. Conversion Jobs<br>6. Testing and Pre-Validation of Data<br>7. Data Validation<br>8. UI/Forms Development for Collection (as needed)<br>9. Testing of UI/Forms for Collection<br>10. Incorporate Updates (since data was landed)<br>11. Implement (plan cutover to new system by source, new collection, access for stakeholders, timing)<br>12. Retire Legacy Sources<br><br>**Responsibilities:**<br>The responsibilities of SECTION include: |

|  |  |  | 1. Confirming/modifying 2021 Data System Assessment recommendations and providing updates on data sources since that was completed<br>2. Provide Wavicle with access to the existing legacy systems and data<br>3. Provide Wavicle with access/permissions for the new cloud environment<br>4. Prioritize legacy source conversion and dependencies<br>5. Identify owners for data domains<br>6. Identify and connect Wavicle with the "most knowledgeable person" to assist as much as possible with:<br>  &bull; Questions about source data, stakeholders, and processes that create it<br>  &bull; Identifying needed linkages with other data<br>  &bull; Identifying collection requirements for UI<br>  &bull; Identifying latency/currency needs, updates/changes, critical data elements<br>7. Providing feedback on conversion plan<br>8. Assist with logistics and communications about project objectives and removing barriers to implementation<br>9. Validate data once converted (Wavicle will pre-validate using automated scripts to compare legacy to new) and sign off on data validation for accuracy and completeness<br>10. Take ownership of retiring old sources after new solution is implemented<br><br>The responsibilities of Wavicle include:<br>1. Review existing documentation and explore data sources<br>2. Determine one-time vs ongoing updates<br>3. Confirm CRUD needs for each source<br>4. Data modeling for the new system with linkages<br>5. Creating conversion plan draft to review with SECTION<br>6. Mapping data from legacy to new system<br>7. Developing and testing conversion processes for each source<br>8. Pre-validating data between legacy and new system |
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| | | | 9. Orienting SECTION personnel to new system in order to perform data validation<br>10. Orienting owners to data lifecycle management<br>11. Developing UI for data collection<br><br>**RASCI Matrix:**<br>Additionally, once the project approach and team are confirmed and Discovery & Analysis has begun, a Responsible / Accountable / Supporting / Consulted / Informed (RASCI) matrix will be created to outline the responsibilities of Wavicle and SECTION. Typically the specific role or individual from each party would be identified for further detail within parts of the data conversion process.<br><br>*Responsible:* The party/role performing the work<br><br>*Accountable:* The party/role accountable to ensure the work is done to the success criteria standards<br><br>*Supporting:* The parties/roles who the Responsible must rely on for a supporting service/technology to get the work done<br><br>*Consulted:* Parties/roles who need to be consulted (i.e., what/when/why/how of the work)<br><br>*Informed:* Parties/roles who need to be aware of certain aspects of the work (e.g., planned, status, outcome)<br><br>**Experience:**<br>Wavicle brings to the table a large group of technologists with significant experience migrating clients from legacy systems onto the cloud. Additionally, team members experienced with natural resources and environmental data will be able to work with SECTION to ensure appropriate data linkages and georeferencing are implemented to further extend the benefits of the new system with integrated data to SECTION users across Units. |
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## Non-Mandatory Specifications

Given that Wavicle Data Solutions is building a custom solution for the SECTION based on cloud platform best practices, all of these specifications can be met with our solution. By using an agile methodology and a "product" approach, the SECTION is in control of the prioritization of these items.

In some cases, meeting all of these specifications fully upfront may result in an overbuilt, extraordinarily expensive system that would not be cost-effective for the SECTION – and perhaps even be wasteful. One of the key benefits cloud-based systems offer is elasticity of technical resource provisioning based on demand/usage, growth, and future requirements. This will allow the SECTION to steward public funds, minimize technical debt, and maintain an optimized carbon footprint for now and in the future. To this end, costs for the solution reflect our recommendation for meeting each specification below.

| Reqt | Specification | A | B |
|------|---------------|---|---|
| **Data** | | | |
| 4.2.3.1 | Does your solution perform basic and table-driven validations and business rules (e.g., required field is empty, invalid entry, too many or not enough digits, invalid character(s), naming conventions, geographic areas)? | Yes | The solution provided will be a two step validation process where the screen validations will be configured in a validation rules table and would be pulled up when the particular UI screen is launched and the validations would be done in UI, the second step business validations if any would be handled in the business layer/backend. We would build a rules engine based on the need when having more deep dive discussions. |
| 4.2.3.2 | Does your solution prevent accidental duplicate data entry? | Yes | There would be validations added in the UI which will make a call to the business layer that checks the DB for any similar data, if so it will ensure to call it out as a duplicate entry in the UI. <br><br> Front-end validations: <br> • Real time checks <br> • Autocomplete suggestions <br> • Mandatory unique identifiers <br><br> Back-end validations: <br> • Database constraints <br>   ○ Unique indexes <br>   ○ Composite keys <br> • Duplicate detection logic <br> • Table-driven and batch processing validations <br>   ○ Hashing <br>   ○ Lookup table |

| | | | • User feedback and Error messaging |
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| 4.2.3.3 | Does your solution generate meaningful and easy-to-understand error messages for data issues? | Yes | Our solution can help craft meaningful and easy-to-understand error messages for data issues, which are vital for a positive user experience and efficient troubleshooting.<br><br>Our approach to creating effective error messages:<br>• Clear and Specific<br>• Actionable<br>• Context-Aware<br>• Polite and Neutral<br>• Readable<br><br>Technical considerations:<br>• Dynamic Error Generation<br>• Localization and Accessibility<br>• Logging for Debugging |
| 4.2.3.4 | Does your solution assign a unique number and track all records? | Yes | Our solution would ensure to assign unique identifiers to records and track them effectively. This would ensure maintaining data integrity, supporting traceability, and enabling efficient record retrieval.<br><br>Technical considerations:<br>• Audit Logs<br>• Change Tracking<br>• Status Fields |
| 4.2.3.5 | Does your solution maintain an audit trail of data changes? | Yes | Our solution maintains a detailed audit trail of data changes, which is essential for ensuring accountability, traceability, and compliance with regulatory requirements. This solution provides an audit trail that typically records what data was changed, when, by whom, and sometimes why.<br><br>Approaches:<br>• Database level auditing<br>• Application level auditing |
| 4.2.3.6 | Does your solution take measures to prevent the accidental deletion or manipulation of data and/or recovery of data? | Yes | Our solution safeguards to prevent accidental deletion or manipulation of data and ensure that data can be recovered if necessary. These measures are critical for maintaining data integrity and reliability.<br><br>Strategies or prevent accidental data deletion:<br>• User interface safeguards – Confirmation dialogs before deletion<br>• Soft deletes – Mark records as deleted without removing it.<br>• Role-based access control (RBAC)<br>• Validation – Pre-delete checks<br>• Data-Locking - Lock critical data to prevent modifications unless explicitly unlocked by an authorized user. |

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| | | | Recovery Measures:<br>• Regular Backups (Full and incremental based on the needs)<br>• Versioning of data records<br>• Transaction management – use DB transactions to group operations that can rollback if something goes wrong. |
| 4.2.3.7 | Does your solution store georeferenced data where appropriate? | Yes | Our solution stores georeferenced data when appropriate. This ensures spatial analysis, mapping, or any other location-based functionality needed (Distance calculations, proximity search, integration will mapping tools, visualization like heat maps, clustered markers, interactive maps).<br><br>Storing Georeferenced data:<br>• Data Models – store latitude and longitude of locations<br>• Choose Geospatial data types - POINT, LINESTRING, POLYGON<br>• Look to store additional geospatial attributes like – Altitude/elevation, metadata (address, country, timestamp) |
| 4.2.3.8 | Does your solution allow for photo collection and storage or allow for linkages to external cloud photo storage locations (e.g., Google Photos)? | Yes | Our solution allows for photo collection and storage, as well as linking to external cloud photo storage locations like Google Photos. Depending on your requirements, this can be implemented with various approaches to balance performance, cost, and scalability.<br><br>Options for Photo Collection and Storage:<br>• Direct Uploads by users into cloud storage like Google cloud storage and maintain metadata of the file in DB for easy reference.<br>• Store photos in database.<br>• Integration with Google photos using Google Photos API<br>• Can also support Dropbox, OneDrive integration<br><br>Key considerations:<br>• Security<br>• Scalability<br>• Compliance<br>• Metadata<br>• Access control |
| 4.2.3.9 | Does your solution provide the ability to edit data collection requirements when | Yes | Our solution will allow for flexible editing of data collection requirements when reporting needs or business requirements change. This is important to ensure that your system can adapt to evolving needs without requiring significant rework. |

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| | reporting requirements change? | | Strategies and approaches to achieve this:<br>• Configurable data collection<br>　○ Dynamic form builder<br>• Data schema evolution - flexible data model that can handle schema changes over time.<br>　○ NoSQL/Document based storage<br>• Schema versioning - Use versioned tables or schemas to accommodate changes in data collection requirements<br>• Reporting logic flexibility - Build reporting logic that can be easily modified or extended to meet new data collection and reporting requirements<br>• Workflow management - Integrate a workflow management system where data collection requirements are tied to specific steps or stages in the workflow. As requirements change, the system can automatically adjust to the new criteria based on workflow changes. |
| **Tools** | | | |
| 4.2.3.10 | Does your solution incorporate online and/or mobile tools for data collection, management, collaboration, analysis, and reporting? | Yes | Mobile data Collection: Reactive Native, Progressive Web Apps which helps with offline caching and can push when user goes online<br><br>Cloud based data collection: Google forms, google sheets, firebase.<br><br>Collaborations tools: use Slack, Teams, Google Meet<br><br>Data analysis and Reporting: cloud based analytics platform like Google Data Studio, Tableau, Power BI<br><br>Mobile friendly dashboards: Custom dashboards using js libraries like chart, plotly, D3, real time analytics |
| 4.2.3.11 | Does your solution allow consumers and editors to flag possible erroneous data for review? | Yes | Our solution allows both consumers (end-users) and editors (administrators or data managers) to flag possible erroneous data for review. This type of functionality helps maintain data quality by enabling users to identify, report, and track issues in the data before they affect reporting or decision-making.<br><br>Strategies to flag data:<br>• UI/UX design to flag data with ability to add reason for flagging.<br>• Workflow to approve and reject and store the audit. Track through status.<br>• Notification and alerts<br>• Dashboards, analytics.<br><br>Wavicle's in-house accelerators EZ Capture and EZ Quality can be used for data validation and quality |

| 4.2.3.12 | Does your solution provide workflow for additional quality assurance/ quality control (QA/QC) of data? Please describe. | Yes | Our solution includes a robust workflow for additional **Quality Assurance (QA)** and **Quality Control (QC)** of data.<br><br>Quality measures:<br>• Input validation and real-time feedback<br>• Automated data quality checks- duplicates, outliers, format errors.<br>• Build workflow that can handle automated checks.<br>• Also ensure cross-validation(validate across different sources), consistency checks, reconciliation.<br>• Monitoring and alerts.<br><br>We also use Wavicle inhouse accelerators EZ Capture and EZ Quality for data validation and quality |
| --- | --- | --- | --- |
| 4.2.3.13 | Does your solution allow for SECTION users to add, edit, and delete data utilizing queries or bulk data clean-up tools? | Yes | Our solution verified the user's role (RBAC) and provide them with option to add, edit, delete data using queries or bulk data clean-up through csv etc.<br><br>Also, specific users can be granted access to database which maintains audit trail for any changes on the tables.<br><br>All data quality, validation checks described in previous questions would be followed when any such action is allowed for user, in addition ability to rollback will be provided. |
| 4.2.3.14 | Does your solution include the ability to create and run customizable analyses and reports? Can these analyses or reports be saved and repeated? | Yes | Our solution includes support for customizable analyses and reports. Depending on the tools and frameworks we are using, such as Power BI, other BI tools, or even a custom solution with React<br>• Analyze with interactive filtering, parameter-based inputs, and data-driven visualizations.<br>• Users can run on-demand and scheduled reports and analysis with user-defined metrics/ KPIs.<br>• save customized reports or analyses and then execute them again with the same parameters or tweak them for future use |
| 4.2.3.15 | Does your solution include the following analysis and reporting functionality: filter, query, sum, sort, display, compile, save, and print to screen, device, or an electronic file? | Yes | Custom filters, querying options and mathematical functions can be exposed like sum, average, count, etc. The solution will also support sort, filter, and display the analysis in UI which can be saved in the form of PDF or other formats (based on type of report) with also integration to print services for screen, device, or file. |
| 4.2.3.16 | Does your solution provide interactive | Yes | Solution provides interactive search and exploration functionality. |

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| | search and exploration functionality? | | Search functionality:<br>• Searchable Filters - interactively search through data using filters like date ranges, categories, or keywords.<br>• Text Search - For large datasets or reports, a text search feature can allow users to quickly find specific terms, data points, or insights within the analysis.<br><br>Exploration functionality:<br>• Drill-Down/Drill-Through - Users can click through charts or tables to access more granular data, gaining deeper insights.<br>• Dynamic Visualizations - Charts, graphs, and tables can be interactive, allowing users to hover over data points, change chart types, or select subsets of data.<br>• Parameter Control - Users can manipulate parameters such as time periods or dimensions and immediately see the changes in reports or visuals<br>Data Exploration:<br>• Interactive Dashboards - users can explore data by selecting different metrics, segments, or time frames, seeing how the data changes in real-time |
| 4.2.3.17 | Does your solution support basic geographic inquiry and data formats for utilization in a GIS? Are quick access, web-based map tools incorporated into your solution? | Yes | Solution supports basic geographic inquiry and integrate with Geographic Information Systems (GIS), as well as incorporate web-based map tools for easy access.<br><br>Geographic inquiry:<br>• Geospatial Data<br>• Geospatial Queries<br>• Visualizations<br><br>GIS integration:<br>• GIS Software - can be integrated with GIS platforms like ArcGIS, QGIS, or other GIS tools, either through APIs or exporting/importing relevant file formats.<br>• Geo-Processing - Capabilities can include basic geospatial analysis such as buffering, overlay analysis, and spatial statistics.<br><br>Web-based Map Tools<br>• Interactive Maps – Leverage tools like Google Maps API.<br>• Quick Access – Access through application<br><br>Location-based Analytics - visualize geographic trends, demographic data, or patterns overlaid on a |

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| | | | map, making data exploration intuitive and actionable. |
| 4.2.3.18 | Does your solution have standard default analysis and reporting capabilities? Please describe. | Yes | Standard default analysis and reporting capabilities to meet common business or operational needs will be available as part of the solution. Analysis and reporting of Pre-Defined Metrics and KPIs, trend analysis, comparison analysis, summary statistics with grouping and filtering will be provided.<br><br>We can also enhance with support for predictive analysis based on the needs. |
| 4.2.3.19 | Does your solution provide an interactive and dynamic analysis and reporting capability? | Yes | Solution provides interactive and dynamic analysis and reporting capabilities, enabling users to engage with data actively and derive insights in real-time.<br><br>Support for:<br>• Dynamic Filtering and Sorting<br>• Drill-Down and Drill-Through<br>• Real-Time Data Updates<br>• Interactive Dashboards<br><br>Solution can also be enhanced to support Scenario Analysis.<br><br>Dynamic reporting support:<br>• Customizable Report Layouts<br>• Multi-Dimensional Views<br>• Interactive Visualizations<br>• Collaboration and integration with external tools. |
| 4.2.3.20 | Does your solution's analysis and reporting tool allow end-users to dynamically modify views and parameters using drag-and-drop and similar functionality? | Yes | Solution includes analysis and reporting tools that allow end-users to dynamically modify views and parameters using drag-and-drop and similar interactive features.<br><br>Dynamic View Modification capabilities:<br>• Drag-and-Drop Interface<br>  ○ Custom Layouts<br>  ○ Field Selection<br>  ○ Ad Hoc Reporting<br>• Interactive Filters<br>  ○ Parameter Controls<br>  ○ Linked Filters<br>• Chart and Visualization Editing – Switch between visualization types, resizing, reconfigurable visual elements |
| 4.2.3.21 | Does the solution's analysis and reporting tool allow data to be | Yes | Solution's analysis and reporting tool can display data in various formats, including **charts**, **tables**, and other visualization types. |

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| | displayed in charts, tables, etc? | | |
| 4.2.3.22 | Does your solution generate standard reports in accordance with a pre-defined schedule, with recurring frequency, and using predefined parameters? | Yes | Solution can generate standard reports according to a pre-defined schedule, with recurring frequency and using predefined parameters. This ensures consistent delivery of insights without manual intervention. |
| 4.2.3.23 | Does your solution distribute standard reports to pre-defined recipients, including both individuals and distribution groups? | Yes | Solution can distribute standard reports to pre-defined recipients, including both individuals and distribution groups. This feature ensures reports reach the right stakeholders automatically and consistently.<br><br>Report Distribution Capabilities:<br>• Recipient Management<br>  o Pre-Defined Individuals<br>  o Distribution Groups<br>  o Dynamic Recipient Selection [ex: Role based add all people with manager roles]<br>• Delivery methods<br>  o Email Delivery<br>  o Cloud-Based Links<br>  o Collaboration Tools (tools like slack, drives etc)<br>  o File Sharing<br>• Scheduling and Automation<br>• Security and Personalization (RBAC)<br>  o Personalized report |
| 4.2.3.24 | Does your solution allow standard report parameters to be modified over time as needed? | Yes | Solution allows use of standard report parameters, and defining custom parameters can be accommodated as needs change over time. |
| 4.2.3.25 | Is the solution capable of using data from multiple, disparate sources with which the solution interfaces? | Yes | Data from disparate sources would be combined to a format in a "data warehouse" which is easy to query and create reports and other analytics. |
| 4.2.3.26 | Does your solution have an interactive management dashboard function that displays real-time and historical data? | Yes | The solution includes an **interactive management dashboard** that displays both **real-time** and **historical data**, empowering users to monitor and analyze performance metrics effectively.<br><br>Live Data Integration and real time alerts will be supported. |

| | | | Historical Data display:<br>• Time-Series Visualizations<br>• Drill-Down and Drill-Through |
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| 4.2.3.27 | Does your solution provide a dashboard that is populated based on the user selecting information and metrics from a predefined list of information and metrics available? | Yes | Solution includes building standard and custom reports with user defined KPIs/metrics and predefined KPIs |
| 4.2.3.28 | Does your solution allow reports to be sent via email or as a dynamic link? | Yes | Reports can be delivered to distribution list through email. The content can be included in the email directly and/or can include a link to access the report live. |
| 4.2.3.29 | Does your solution support secure data export for offline analysis in GIS (e.g., ArcGIS formats), statistical (e.g., R, csv, txt formats), business intelligence and data visualization (e.g., Tableau, Power BI formats), and other formats? Provide a list of data formats / file types your solution can export to. | Yes | Reports can be exported to GIS formats like ArcGIS, PDF, CSV, R, txt and BI tools (Power BI, Tableau, Google Looker, to be finalized during discovery phase) through the application. |
| 4.2.3.30 | Does your solution have a process for archiving data? | Yes | Solution provides a configurable time, data prior to this time can be purged. Scheduled jobs can be set up for archiving such data. |
| 4.2.3.31 | Does your solution support replication to a WV hosted database for direct connection to primary, unprocessed data? | Yes | Solution can support replication to a West Virginia hosted DB. Ability to access primary and unprocessed data would be provided based on RBAC.<br><br>There are multiple replication options to choose from, depending on the use case. Replication strategy can be decided during the design process:<br>• Real-Time Replication<br>• Batch Replication<br>• Change Data Capture (CDC) |

| 4.2.3.32 | Does your solution include training for users? | Yes | Solution includes providing all the training documents, user manuals, troubleshooting documents, runbooks. |
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| | | | We are also including time for online live and recorded training sessions with each unit for the initial go-live and quarterly. We have included "superuser" training for 3-4 SECTION resources who are the most curious and comfortable with the system so that they can be knowledge keepers within your organization. |
| 4.2.3.33 | Does your solution provide a Frequently Asked Questions feature? If so, please describe. | Yes | Solution provides users with a convenient way to access commonly needed information. This improves user experience by reducing support requests and enabling quick self-service. Support for the following: <br>• Searchable Content <br>• Categorized Questions <br>• Dynamic and Interactive FAQs <br>• Personalization <br>• Contextual Help <br><br> SECTION has the option to prioritize additional knowledge management capabilities during year 2 for things like chatbot, user ratings of answers, or other things that would be most useful to SECTION. |
| 4.2.3.34 | Does your solution provide Help Desk services? If so, please provide a proposed structure for a Help Desk function, including division of responsibility between the SECTION and Vendor, services provided, and hours of coverage. | Yes | Solution includes Help Desk services to support users effectively. <br><br> Ability to support 24*7, 9*5, or any other combination of hours needed. The cost reflected in our proposal is for 8am-5pm Eastern time x 5 days a week, but this can be revised during contract negotiations and price adjusted appropriately. <br><br> **Division of Responsibilities** |

**Division of Responsibilities**

| Responsibility | User | Vendor |
|---|---|---|
| Basic Troubleshooting | Ensure local hardware and network connectivity. | Provide troubleshooting guides and FAQs. |
| Issue Reporting | Report issues through a SECTION or DIVISION help desk system. | Respond to tickets assigned to solution team and update issue-tracking system. |

| Training and User Documentation | Participate in training and refer to vendor-provided documentation. | Develop and supply training materials and sessions. |
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| Software and System Updates | Notify vendor of required updates if needed. | Deploy system patches, updates, and upgrades. |
| Data Privacy and Compliance | Maintain local compliance with organizational policies. | Ensure system complies with organizational policies and standards (assume these are based on data privacy regulations for PII, PCI, etc). |
| Escalation of Complex Issues | Escalate unresolved issues to the vendor's Help Desk. | Provide Tier 2 and Tier 3 support. |

L1 support - Handles common issues, such as login problems, basic how-tos, and frequently asked questions.
*Services Provided:*
- Password resets.
- Navigation assistance.
- Resolution of basic configuration issues.

L2 support - Resolves technical issues requiring deeper system knowledge.
*Services provided:*
- Diagnosing software bugs.
- Guiding users through advanced configurations.
- Addressing performance issues.

L3 support - Handles complex problems or escalations that may involve customization or development work.
*Services Provided:*
- Bug fixes and patches.
- Feature requests and customizations.

|  |  |  | • Collaboration with other vendors or third-party integrations.<br><br>Ensures following:<br>• Proactive Monitoring and Maintenance<br>• Knowledge Base Access<br>• Service-Level Agreements (SLAs)<br><br>Communication channels:<br>• SECTION Support portal if any<br>• Chat system like Slack, Teams, Google Meet<br>• Phone support<br>• Email |
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| **Mobile Application** | | | |
| 4.2.3.35 | Does your solution allow for off-line data collection on a mobile application? Could your solutions be integrated with ArcGIS Survey123 and/or Field Maps? Please explain. | Yes | Solution supports **offline data collection** through a mobile application, and it can be integrated with **ArcGIS Survey123** and **Field Maps** for spatial data collection and fieldwork. Data is stored locally on the device and **synchronized** once a connection is available.<br><br>Features of offline data collection:<br>• Forms and Surveys<br>• GPS Integration<br>• Multimedia – photos, videos, audio<br><br>Collected data from Survey123 can be synced with solution's database or systems, either via API or direct database integration once the device is online. The collected data, including GPS points, can be mapped and analyzed directly in the **ArcGIS** platform or visualized in solution's map interface.<br>Data would be pushed or pulled using APIs or ArcGIS SDKs. |
| 4.2.3.36 | Does your solution include a native app for both iOS and Android platforms for data collection and basic reporting? Please describe. | Yes | We do not need to develop a custom app for iOS and Android rather set up a web application as a PWA that can be downloaded as a mobile web app which acts as native applications in any mobile platforms, This can be achieved using React Progressive Web Application (PWA). This will collect data and store in local storage until the user is connected.<br><br>Note: If a native app for iOS and Android is needed rather than the approach above, further discussion would be needed to assess the requirements, estimate cost, and schedule this work separately. This is not included in our estimate. |
| 4.2.3.37 | If an app is provided, does your solution maintain the app | Yes | Using the PWA approach would not require updating on the client side through an app store. |

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| | and the responsibility for posting and updating the app through the various app stores? | | |
| **Technical** | | | |
| 4.2.3.38 | Does your solution include a dedicated Development environment? | Yes | Dedicated development, test/QA, and UAT environments would be used before the solution moves to the production environment for go-live. Development environment would require access to all the services/tools. |
| 4.2.3.39 | Does your solution include a dedicated User Acceptance Testing (UAT) environment? | Yes | As noted above, a dedicated UAT environment would be part of the solution. End-to-end user scenarios would be validated in this environment. This environment would be a replica of the production environment, all functional and non-functional testing (performance, scalable, available, stress testing, load testing) would be conducted in the UAT environment as well. |
| 4.2.3.40 | Does your solution include a dedicated Production environment? | Yes | As noted above, a dedicated production environment would be set up for end users. Which will be monitored for any queries from customer, ensure proper alerts are set up to make sure the infrastructure is available always. |
| 4.2.3.41 | Does your solution have a testing/release process? Please describe and include what procedures it includes. | Yes | Our solution would contain a release checklist and regression test suite that focuses on seamless, defect-free delivery.<br><br>Process checklist:<br>• Development and Pre-Testing<br>  o Code Development<br>  o Unit Testing<br>• Integration Testing<br>• Quality Assurance (QA) Testing<br>  o Test Environment Setup<br>  o Functional Testing<br>  o Regression Testing<br>  o Performance Testing<br>• User Acceptance testing (UAT) Testing<br>  o End-User Involvement<br>  o Feedback Loop<br>• Release Preparation<br>  o Release Documentation<br>  o Release Candidate<br>• Deployment<br>  o Staging Deployment<br>  o Smoke testing<br>  o Production Release |

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| | | | • Post-Release Monitoring and Support<br>   o Monitoring<br>   o Bug Fixes<br>   o User Feedback<br><br>The above is handled via following procedures<br>• Version Control<br>• CI/CD Pipeline<br>• Release Schedule<br>• Rollback Procedures<br><br>Additional testing:<br>• Security Testing<br>• Accessibility Testing |
| 4.2.3.42 | Does your solution allow for the management of upgrades? Please describe the process? | Yes | Solution includes a **structured process for managing releases**, which ensures that new versions or updates to the system are deployed smoothly, without disrupting service or causing issues for users.<br><br>Release management process:<br>• Pre-Release Planning<br>   o Assessment of New Version - Review Release Notes, Compatibility Check, Risk Assessment, User Communication<br>   o Backup and Contingency Planning - Backup Systems and Data, Rollback Procedures<br>• Testing the Upgrade<br>   o Test in Staging Environment - Staging Deployment, Smoke Testing, Functional Testing, Regression Testing, Performance Testing<br>   o User Acceptance Testing - Feedback from End Users<br>• Scheduling and Deployment<br>   o Deployment Preparation - Release Notes, Maintenance Window, Clear Communication<br>   o Upgrade Deployment - Rolling Deployment, Full Deployment.<br>• Post-Release Activities<br>   o Verification and Monitoring - Post-Upgrade Testing, System Monitoring, User Feedback.<br>   o Bug Fixes and Patches – Hotfixes<br>• Post-Release Support and Maintenance<br>   o Ongoing Monitoring - Performance and Security Monitoring, Security Patches<br>   o Documentation and Training - Updated Documentation, User Training<br>• Continuous Improvement<br>   o Review and Learn |

| | | | o   Iterative Improvements |
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| 4.2.3.43 | Please list specific browsers for which the solution is compatible and not compatible. | Yes | The solution will be compatible with browsers like Chrome, Firefox, Safari, Microsoft Edge. Testing will cover these 4 options.<br><br>Browsers such as Opera and DuckDuckGo are unlikely to work optimally with the solution. |
| 4.2.3.44 | Does your solution use a responsive design for use with mobile devices? | Yes | A responsive UI design would be used to support the application across different screen resolutions. According to the screen size the UX designs would vary. |
| 4.2.3.45 | Does your solution allow for internal (SECTION) system, account, and permissions administration? Please describe. | | Our solution leverages Google Cloud's Identity and Access Management (IAM) system allows SECTION to define fine-grained access controls, granting specific permissions to different users and groups. |
| 4.2.3.46 | Does your solution provide secure remote access for conducting system administrator functions? | | Our solution is built leveraging Google Public Sector's cloud capabilities, allowing for the secure remote access for all administrators and users via Google's Identity and Access Management (IAM) system. |
| 4.2.3.47 | Does your solution time out after a specific period of inactivity? | No | The solution is designed to be available for use 24/7. However, IAM access controls can be set so that individual users are logged out after a period of inactivity per SECTION guidelines. |
| 4.2.3.48 | Does your solution employ interactive help features for specific data elements to offer explanations (e.g., mouse-overs, pop-ups, etc)? | Yes | Context-based help would be available based on user activity and screen. Tooltips with additional information would be provided to assist users; typically a subset of data elements (30-50% or fewer) need tooltips. |
| 4.2.3.49 | Does your solution use the most current technologies available? | Yes | Solution is built on recent stable version of React, React native, .NET, Jenkins, Docker, Kubernetes, Node js on top of Google cloud native services. |
| 4.2.3.50 | Does your solution operate in a real-time integrated transactional environment? | Yes | Solution works in real-time integrated transactional environment but at the same time can also work with offline cached data and push when user goes online. |
| 4.2.3.51 | Is your solution fully compatible | Yes | The solution would be compatible across different customer equipment and devices like mobile, tablets, |

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| | with end user equipment? | | desktops. The Data Needs Assessment did not include any applications or suggestion of devices that would require different compatibility needs |
| 4.2.3.52 | Does your solution have a capacity planning methodology for managing high/low use levels? Please describe. | Yes | Solution includes a **capacity planning methodology** designed to effectively manage **high and low use levels**. This methodology ensures that the system can handle fluctuations in traffic or demand, whether it is high usage during peak times or low usage during off-peak periods. Proper capacity planning helps optimize performance, control costs, and ensure reliability.<br><br>Detailed breakdown of the **capacity planning methodology**<br>• Understanding Current Capacity<br>  ○ Current System Assessment: Resource Utilization Metrics, Performance Baselines, Current Traffic Patterns<br>• Forecasting Demand<br>  ○ Demand Forecasting - Historical Data Analysis, Business Growth Projections, External Factors, Wavicle built accelerator **Demand forecasting**<br>• Scaling Strategy<br>  ○ Horizontal vs. Vertical Scaling<br>  ○ Auto-Scaling<br>• Load Balancing - Distributed Load Balancing, Dynamic Load Balancing<br>• High Availability and Redundancy - Fault Tolerance, Failover Systems, Data Replication<br>• Performance Tuning – Caching, Database Optimization<br>• Testing and Simulation - Simulate Traffic, Stress Testing, Performance Benchmarks<br>• Monitoring and Alerts<br>  ○ Monitoring Tools – Prometheus, Grafana<br>  ○ Capacity Planning Feedback Loop<br>• Cost Optimization - Cloud Services flexible pricing model, Right-Sizing<br>• Continuous Review and Adaptation - Data-Driven Decisions, Iterative Scaling |
| 4.2.3.53 | Is your solution scalable to allow for increases in users and functional capacity without degrading performance? | Yes | As described in previous question, solution is capable to scale horizontally and vertically, with autoscaling features from Google Cloud Platform the capacity can increased or decreased based on demand and traffic. |
| 4.2.3.54 | Is your solution designed such that | Yes | Solution is designed with a **fault-tolerant architecture** to ensure that **compromised** |

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| | compromised functions, errors or faults will not degrade the overall integrity of the system? | | **functions, errors, or faults** do not degrade the overall integrity of the system. This approach minimizes the risk of system-wide failures and ensures that the system remains operational even when individual components experience issues.<br><br>These aspects are the focus of consideration:<br>• Fault Isolation - Component Isolation, Error Handling<br>• Redundancy and High Availability<br>• Load Balancing and Failover<br>• Circuit Breaker Pattern<br>• Error Propagation Control – gracefully handling errors<br>• Data Integrity and Consistency<br>• Monitoring and Alerts<br>• Robust testing approaches<br>• Continuous improvement<br>• Security and Integrity Protection<br><br>By employing these techniques, the system maintains **high availability**, **data consistency**, and **reliable performance**, even during periods of failure or fault in some of its components. |
| 4.2.3.55 | Does your solution provide the capability to interface with existing SECTION systems to obtain information? | | Our solution can leverage GCP's capabilities to connect to all existing SECTION systems securely via API. |
| 4.2.3.56 | Does your solution provide secure FTP (File Transfer Protocol)? | Yes | The solution provides **Secure File Transfer Protocol (SFTP)**, which ensures that file transfers are encrypted and secure during transit.<br>SFTP implementation strategy:<br>• Encryption and Security<br>   ○ Data Encryption<br>   ○ Authentication<br>   ○ Integrity Checks - Use cryptographic hash functions to verify that files are not altered during transfer.<br>• Compliance with Industry Standards<br>   ○ **HIPAA**, **GDPR**, **PCI-DSS**: Meets security and privacy requirements for industries that require secure file transfers, ensuring compliance with data protection regulations.<br>• Access Control<br>   ○ Role-Based Access<br>   ○ IP Whitelisting<br>   ○ Audit Trails |

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| 4.2.3.57 | Does your solution provide a consistent and standard design style sheet for all modules using the same page layouts, color scheme and data fields? | Yes | The styles or themes would be applied at the application level, module level or page level or components level as needed to ensure consistent layout. Part of the project work will be to understand what SECTION would like to use; we are happy to base on a style guide that you may have.<br><br>Solution would leverage config-driven UI framework which will ensure consistent components are developed across different screens. |
| 4.2.3.58 | Does your solution provide the ability to monitor the system for breaches and intrusions and log attempts? Please describe what occurs when an attempted system breach or intrusion is identified. | Yes | Solution is designed to provide comprehensive monitoring for breaches, intrusions, and unauthorized attempts to access the system. It includes features for **real-time monitoring**, **incident detection**, and **logging** to ensure that any attempted security breach or intrusion is immediately identified, tracked, and acted upon. Our solution can integrate with whatever SECTION and DIVISION use and can also take advantage of Google Cloud Platform services and features.<br>• Continuous Monitoring for Security Events<br>  o Security Monitoring Tools - Intrusion Detection Systems (**Snort**, **Suricata**, or **OSSEC**), Security Information and Event Management (Splunk, Elastic stack, IBM QRadar), Network Traffic Analysis<br>• Breach or Intrusion Detection<br>  o Types of Events Monitored:<br>    ▪ Login Attempts<br>    ▪ Privilege Escalation<br>    ▪ Unusual Activity<br>    ▪ Malware or Ransomware<br>    ▪ Cross-Site Scripting (XSS) / SQL Injection<br>• Logging of Intrusion Attempts<br>  o Timestamp, IP Address, User/Account Information, Event Type, Targeted Resources<br>  o Native log management tools from Google cloud or any other cloud vendor.<br>• Automated Response to Intrusions<br>  o Immediate Actions Upon Detection - Account Lockout, Blocking IP Addresses, Alerting Security Teams, Quarantine or Isolation<br>• Incident Response and Forensics<br>  o Incident Response Process – Investigation, Root Cause Analysis, Containment, Eradication, Recovery, Post-Incident Review<br>• Threat Intelligence Integration - FireEye, CrowdStrike, and Palo Alto Networks |

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| | | | • Continuous Improvement - Vulnerability Scanning, Penetration Testing, Security Audits |
| 4.2.3.59 | Does your solution alert designated persons when performance issues arise? | Yes | Email alerts, communication channel alerts will be notified to distribution list |
| 4.2.3.60 | Does your solution provide escalation alerts for system issues? | Yes | Email alerts, communication channel alerts will be notified to distribution list for any system issues like unavailability of service or memory consumed beyond threshold limit. |
| 4.2.3.61 | Does your solution maintain logs of all system access/log-on attempts, successful or not? | Yes | As described in previous questions any login attempt irrespective of whether success or failure will be captured for audit purpose. |
| 4.2.3.62 | Does your solution maintain logs of all system activity? | Yes | All system activity will be logged, details as explained to question in the above table. |
| 4.2.3.63 | Does your solution maintain logs of all system errors? | Yes | All system error will be logged and notify target recipients (see details in above table (4.2.3.58). |
| 4.2.3.64 | Does your solution issues alerts if an interface or data source becomes unavailable? | Yes | Similar to system errors, these will be logged and notify target recipients (see details in above table (4.2.3.58). |
| 4.2.3.65 | Does your solution issue alerts if the system becomes unavailable? | Yes | Similar to system errors, these will be logged and notify target recipients (see details in above table (4.2.3.58). |
| 4.2.3.66 | Does your solution provide web analytics for monitoring visitor traffic and usage of the system? | Yes | Similar to system errors, these will be logged and notify target recipients (see details in above table (4.2.3.58). |
| 4.2.3.67 | Does your solution notify online users of scheduled downtown when they log in (if they are trying to interact with the system during or immediately prior to a maintenance period)? | Yes | Similar to system errors, these will be logged and notify target recipients (see details in above table (4.2.3.58). |

| 4.2.3.68 | Does your solution have the ability to scale up/down support services as needed (help desk, development, etc.)? | Yes | The solution cost has been estimated with staffing based on understanding of the RFP requirements. Wavicle is able to provide additional resources at an additional cost. Cloud resources can also be scaled up/down but may have a cost difference. |
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| **Hosting** | | | |
| 4.2.3.69 | Does your solution include redundancies, expandability, capacity management, and monitoring? | Yes | These are all available within GCP or Google Public Sector's cloud infrastructure. The solution would leverage these capabilities. |
| 4.2.3.70 | Does your solution provide a location within the United States for all solution components including, but not limited to, data centers, infrastructure, network, hardware, and software? | | Our solution can leverage Google Public Sector's existing cloud infrastructure, which is securely housed within the United States for all solution components, services, data, and infrastructure. |
| 4.2.3.71 | Does your solution provide for hosting in a Tier 4 secure facility? | Yes | Google Public Sector's Cloud services are Tier 4 secure. |
| 4.2.3.72 | Does your solution provide for hosting in an environment with a redundant power source? | Yes | Google Public Sector's Cloud services have redundant power sources and failover systems. |
| 4.2.3.73 | Does your solution provide a redundant architecture that is supported by multiple geographically diverse data centers? | Yes | Google Public Sector's Cloud Services has many geographically diverse data centers across the United States. |
| 4.2.3.74 | Does your solution's system architecture provide route diversity between | Yes | Google Public Sector's Cloud Services allow for route diversity and the use of multiple back up / redundant data centers. |

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| | the primary data center and the back-up/redundant data center? | | |
| 4.2.3.75 | Does your solution provide the back-up, fail-over site with performance levels identical to the primary site? | Yes | GCP offers the option for identical services at redundant location. |
| 4.2.3.76 | Does your solution to provide the capability to remain operational in the event of loss of availability of one or more data sources? | Yes | Loss of availability of one or more data sources would only impact the updating of that specific data; the solution would remain operational otherwise. |
| 4.2.3.77 | Does your solution provide components that are physically and logically segregated from the components of other systems. | Yes | The solution ensures the backend and front end follow microservice architecture which ensures components are logically and physically segregated from each other. |
| 4.2.3.78 | Does your solution use hardware the is dedicated to the SECTION solution? If not, please explain. | Yes | Solution leverages the dedicated hardware assigned to it. |
| 4.2.3.79 | Does your solution provide data backup? Please describe the approach and the location of where backup will be stored? | Yes | GCP's redundancy options provide this. |
| **Security and Privacy** | | | |
| 4.2.3.80 | Does your solution authenticate users and manage and automate resetting of passwords? Please describe and cite compliance with any industry | Yes | Solution authenticates users and automates password management, ensuring robust security for user access while adhering to industry best practices and compliance with relevant regulations. Authentication process and password management features:<br>• User Authentication Process -<br>   o Multi-Factor Authentication<br>   o Strong Password Policies |

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| | standards if applicable. Please include details such as displaying passwords on screen, storage and encryption, response to failed login attempts, transmission of user identification, and any other relevant details about the process. | | <ul><li>Single Sign-On (SSO) Integration – Okta, GCP Identity, or whatever SECTION uses can be integrated; there would be additional costs if not currently in use.</li></ul><br>• Password Management and Automation<ul><li>Automated Password Reset – when password forgotten.</li></ul>• Password Expiry and Rotation - forced periodic change<br>• Password Display, Storage, and Encryption<ul><li>**Passwords are never displayed** on the screen</li><li>**Passwords are stored securely** in a hashed and salted format</li><li>**Encryption of passwords** in transit and at rest</li></ul>• Response to Failed Login Attempts<ul><li>Account Lockout Mechanism</li><li>CAPTCHA and Rate Limiting</li><li>Alerts for Suspicious Activity</li></ul>• User Identification and Transmission<ul><li>User Identification</li><li>Secure Transmission of User Credentials</li></ul>• Compliance with Industry Standards and Regulations<ul><li>Digital Identity Guidelines [National Institute of Standards and Technology (NIST)]</li></ul>• PCI DSS (Payment Card Industry Data Security Standard) |
| 4.2.3.81 | Does your solution comply with federal and state laws and regulations including the protection of personally identifiable information? If yes, please cite the specific laws and regulations with which the solution complies. | Yes | Meeting this specification would require additional investigation and discussion (especially around the data from the Electronic Licensing System), but it does not appear that neighboring states' laws (e.g., MODPA, Virginia's CDPA) would affect this solution since SECTION does not target consumers in those states. Other states' laws do not appear to apply either.<br><br>Federally, it does not appear that HIPAA, the Privacy Act of 1974, Gramm-Leach-Billey, SOX, or COPPA are relevant to this solution. The EU's GDPR also should not apply.<br><br>This noted, our solution is built on Google Public Sector's secure Cloud which has achieved multiple public sector authorizations including FedRAMP Hight Authorization, Impact Level 4 (IL4), CJIS compliance, and IRS 1075 compliance. |
| 4.2.3.82 | Does your solution store confidential | Yes | Solution can store **confidential data**, and the storage process is designed to prioritize **security,** |

| | | | |
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| | data? Please describe the storage process. | | **confidentiality, and compliance** with industry standards.<br><br>Confidential data is classified based on sensitivity to ensure proper handling and protection. Sensitive data categories may include:<br>• Personally Identifiable Information (PII) (e.g., names, social security numbers, email addresses).<br>• Payment Card Information (e.g., credit card numbers, CVV).<br>• Health Information (e.g., medical records, health identifiers).<br>• Proprietary Business Data (e.g., intellectual property, business secrets).<br><br>Encryption strategies as described in above questions for data in transit and rest will be followed along with RBAC. |
| 4.2.3.83 | Does your solution protect against viruses, malicious software and other online threats? | Yes | Solution is designed with multiple layers of security to protect against viruses, malicious software, and other online threats. These protections are implemented across various levels, including infrastructure, application, and data security.<br><br>Antivirus and Anti-Malware Protection:<br>• Endpoint Protection – signed APIs<br>• Web and Email Filtering<br><br>Network Security:<br>• Firewalls<br>• Intrusion Detection and Prevention Systems (IDPS)<br>• Network Segmentation - isolate critical systems and sensitive data from the rest of the network<br><br>Application and Web Security<br>• Web Application Firewalls – XSS, CSRF, SQL injections, DDoS<br><br>Ransomware Protection<br>• Backup and Recovery - Ransomware protection, Offline and immutable backups<br>• Behavioral Analysis<br><br>Security Information and Event Management (SIEM) - centralize logging and real-time analysis of security data from various sources<br>• User Security Awareness and Training - User training, Phishing simulations<br>• Vulnerability Management and Patch Management – Described in other section. |

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| | | | Incident Response Plan:<br>• Immediate containment.<br>• Forensics and investigation<br>• Remediation and recovery<br>• Communication |
| 4.2.3.84 | Does your solution employ reliable state-of-the-art technology for resisting denial-of-service and other hostile attacks? | Yes | Solution employs state-of-the-art technologies to resist denial-of-service (DoS) and other hostile attacks. The defense mechanisms are designed to mitigate threats, ensure high availability, and protect against malicious attempts to disrupt or compromise system integrity. Solution utilizes a **multi-layered approach** to protect against **DoS attacks** and **hostile threats**, including **DDoS mitigation services**, **traffic anomaly detection**, **advanced WAFs**, **intrusion prevention systems**, and **real-time threat intelligence**. It also leverages **load balancing**, **API security**, **rate limiting**, and **Zero Trust** models. |
| 4.2.3.85 | Does your solution secure sensitive data such as using industry standard encryption methods? Please describe. | Yes | Solution is designed to **secure sensitive data** using **industry-standard encryption methods** to ensure the confidentiality, integrity, and availability of sensitive information. Sensitive data, both in transit and at rest, is protected with robust encryption protocols to safeguard it from unauthorized access and potential breaches.<br><br>**Data in transit:**<br>• Transport Layer Security - encrypt data during transmission over networks<br>• Secure File Transfer Protocols (SFTP) - ensure that sensitive information, such as personally identifiable information (PII) or financial data, is encrypted before it leaves one system and is decrypted only by the authorized recipient.<br>• Virtual Private Networks<br><br>**Encryption of data at Rest:**<br>• Full Disk Encryption (Tech like File Vault, Bit locker)<br>• Database Encryption - **Transparent Data Encryption (TDE)** is used in databases to automatically encrypt database files, including tables, indexes, and logs. This ensures that sensitive data is protected while stored in the database<br>• Encrypted Backup Storage - Backup data, which may contain sensitive information, is also encrypted before being stored. Backup solutions, such as those based on **AES-256** or similar algorithms, ensure that backup data is protected both in transit and when stored on local or cloud |

| | | | backup servers. **Google Cloud Storage** support encryption by default for data stored in the cloud. <br>• Encryption of Sensitive Data in Applications <br>  o Application-Level Encryption - sensitive data is encrypted before it is stored in the database or sent across the network. <br>  o **AES-256** or **RSA** encryption algorithms, Password Hashing <br>• Key Management System - generate, store, and manage cryptographic keys securely, key rotation, access control. <br><br>GCP supports the following: <br>• General Data Protection Regulation (GDPR) <br>• Health Insurance Portability and Accountability Act (HIPAA) <br>• Payment Card Industry Data Security Standard (PCI DSS) |
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| 4.2.3.86 | Does your solution encrypt all data in transit, including data transfers? | Yes | Any data transfer from one system to other will be encrypted. Sensitive data from UI to business layer will also be encrypted. This includes SFTP of sensitive data. |
| **Minimum Performance Volumes** | | | |
| 4.2.3.87 | Does your solution support up to 100 concurrent internal SECTION users? | Yes | Will consider this part of solution requirements |
| 4.2.3.88 | Does your solution handle a minimum of 250 projects? | Yes | Will consider this part of solution requirements |
| 4.2.3.89 | Does your solution store up to 40 million database records? | Yes | Will consider this part of solution requirements |
| 4.2.3.90 | Does your solution's website hosting support over 100 concurrent visitors during daytime hours? | Yes | Will consider this part of solution requirements |
| **Warranty, Maintenance, and Operations** | | | |
| 4.2.3.91 | Does your solution provide warranty support and maintenance? Please include specifics as to when the warranty begins and the | Yes | The solution schedule and staffing has been planned to implement solution requirements within the first 12 months; months 13-24 would have a reduced team that would provide solution support, defect fixes, enhancements, and any low priority items deferred from the first 12 months. |

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| | duration of the warranty. | | |
| 4.2.3.92 | Does your solution provide the most recently available version(s) of software, operating systems and database management systems used at the time of deployment? Describe the proposed approach. | Yes | Solution is designed to provide the **most recently available version(s)** of software, operating systems, and database management systems (DBMS) used at the time of deployment. The proposed approach ensures that the system is deployed using the latest stable and secure versions of each component, and that it remains up to date throughout its lifecycle. This is achieved through a combination of automated processes, regular updates, and version management strategies.<br>Proposed approach includes:<br>• Initial Deployment with Latest Stable Versions.<br>• Vendor-Approved Versions<br>• Ongoing Version Management and Updates<br>  ○ Automated Software Updates<br>  ○ Database Versioning<br>  ○ Security Patch Management<br>• Regular Maintenance and Testing of New Releases<br>  ○ Testing New Versions<br>  ○ User Acceptance Testing<br>  ○ Scheduled Maintenance Windows<br>• Version Downgrades and Rollbacks - Rollback Strategies<br>• Compliance with Vendor and Industry Standards<br>• Continuous Improvement and Monitoring |
| 4.2.3.93 | Does your solution provide on-going updates throughout the life of the contract? | Yes | The solution schedule and staffing has been planned to implement solution requirements within the first 12 months; months 13-24 would have a reduced team that would provide solution support, defect fixes, enhancements, and any low priority items deferred from the first 12 months. |
| 4.2.3.94 | Does your solution provide maintenance and ongoing technical assistance for the hosted solution, including the proposed levels of support and application fix resolution times? | Yes | The solution schedule and staffing has been planned to implement solution requirements within the first 12 months; months 13-24 would have a reduced team that would provide solution support, defect fixes, enhancements, and any lower-priority items deferred from the first 12 months. |

# Qualifications and Experience

## Business

Wavicle's core business is delivering cloud-based data and analytics solutions. Our rapid-delivery data and analytics solutions leverage cloud technologies and proprietary accelerators to quickly give you trusted data to drive innovation and improve decision-making. From data warehouses to data lakes and data mesh, everything we do is in the cloud. With reporting solutions, data visualizations, and advanced analytics and data science, we turn data into actionable insights.

Wavicle excels in developing custom applications for data and analytics use cases, and we know how to bring users along on the journey so they embrace the change! The bottom line is that Wavicle is big enough to have the right mix of skills and experience to deliver successfully...but also small enough to listen, meet you where you are, and collaborate as partners on the way forward.

## Relevant Experience

Wavicle has completed several similar projects within the past 3 years. High-level summaries of challenges, solution, and results for two of these projects are shared below.

1) **Signal Behavioral Health Network** is a Managed Service Organization (MSO) and Administrative Services Organization (ASO) for the State of Colorado Behavioral Health Administration (BHA). Wavicle developed and is currently supporting enhancements and additional capabilities for the Unity application.

   **Challenge:**

   This managed services organization (MSO) needed to replace its aging and outdated core business application, which managed contracts and clinical information, to prepare to triple their user base.

   The MSO's legacy system could not keep pace as the organization grew, and they battled with siloed data across the four different applications that spanned their five programs. With disjointed data and no dedicated reporting platform, the MSO struggled to make data-driven decisions. They needed a centralized platform with modern capabilities to accommodate their growing user base.

   **Solution:**
   Wavicle experts gathered requirements and implemented a modern solution with unified storage and reporting. Using Microsoft Azure to craft a custom cloud-based web application, integrating Fast Healthcare Interoperability Resources (FHIR) standards, and including Power BI for reporting, the new solution offers unified and

secure data storage, comprehensive reports, efficient data exchange, and seamless communication among different health systems.

**Result:**

Through the consolidation of data from the MSO's five distinct programs into a single, unified system, Wavicle helped the MSO streamline operations and eliminate redundancies and manual processes. The new scalable and secure application offers centralized data storage and management for clinical data as well as the ability for the MSO to easily analyze behavioral health program data for compliance, trends, and continuous improvement.

2) **True Value** is a family of independent hardware retailers with over 4500 locations across the United States.

   **Challenge:**

   This national retailer needed a modern ordering system that leverages machine learning and artificial intelligence to get updated pricing insights and simplify the ordering process.

   They partnered with Wavicle to develop a cloud-based order management portal that streamlines and optimizes inventory to improve store operations and customer satisfaction.

   **Solution:**

   Wavicle developed a modern ordering solution that included a web-based order management portal powered by cloud technologies, enabling faster data integration and analysis. It combines mainframe product data with updated pricing data; uses ML to optimize pricing models; and incorporates digital images, scanning, and POS integration.

   **Result:**

   The solution offers enhanced product and pricing insights, improving the ordering experience for stores and customers. It reduces time spent on ordering and inventory management through faster search results, imagery, and integration with scanners and mobile devices.

   It resulted in fast and accurate ordering, competitive insights, simplified inventory management, and a customizable online catalog.

## Corporate Identity

Wavicle Data Solutions LLC (Wavicle) was formed in 2013 and operates under FEIN 61-1989765.

US Headquarters address:

1111 W. 22nd Street
Suite 270
Oak Brook, IL 60523

Office phone is 630-756-2632, and no fax number is currently available.

Website: http://www.wavicledata.com

For this RFP, contact email is debbie.sweet@wavicledata.com, and the company's general email address is info@wavicledata.com).

# Organization and Structure

## Organization

Wavicle is organized into three main areas: Delivery, Growth, and Operations. The Delivery organization is composed of technologists, program and project managers, and business technical analysts. The Growth organization includes business and industry consultants, industry practice leaders, and account executives. Operations includes Marketing, Legal, Finance, Accounting, Human Resources, and other shared services functions.

Wavicle is proud to be recognized as a Certified Minority Business Enterprise by the National Minority Supplier Development Council (NMSDC). Wavicle's approach to solutioning is vendor-agnostic, yet we are skilled enough to be recognized as a partner by some of the top technology companies, such as Google Cloud Platform, Microsoft Azure, Amazon Web Services (AWS), Databricks, Snowflake, and others. Wavicle has also been recognized by Inc 5000, Crains Chicago' Business Fast 50, Asian American Business Fast 50, The Cloud Awards, The Stevie Awards – Bronze Level, and Clutch Top 1000 Companies.

## Resources

Resources providing design, development, testing, training, project/program management, change management, data governance, and support services will be sourced from Wavicle's US-based workforce as well as India-based resources (and potentially Montreal-based resources). Our blend of US-based and offshore resources offers extended-day coverage for support, ability to scale and flex resources as needed, an optimal price point, and the right expertise at the right time both during the development period as well as support afterward. At no time will all resources be all sourced solely from the US or solely from India.

Natural resources and wildlife experience will come from Wavicle's US-based employee and contractor network, primarily based from remote (home or university office) locations in Florida, Texas, Michigan, and Arizona.

Whether we are staffing employees or contractors for a project, lead time to engage resources is 2-4 weeks. In the event that our available employees are not a match at the time of contract start, we curate a contractor network of people we have experience working with in order to fill any gaps. We do keep our contractor network "warm" when proposing for new work so that we have multiple options and are prepared when we are notified of contract awards.

## Locations

The main headquarters for Wavicle Data Solutions is in Oak Brook, Illinois, United States (US). Additional Wavicle Data Solutions offices are located in Montreal, Canada; Dubai, United Arab Emirates (UAE); Chennai, India; and Coimbatore, India (India headquarters). Specific locations are listed below (* indicates primary locations, **indicates potential locations).

The contract with SECTION, including all responsibility and accountability, would be administered out of the Oak Brook office. US-based employees and subcontractors have options to work from the office, remote locations within the US, and occasionally client sites. Selected US-based Wavicle project team members are able to travel and be onsite with SECTION for important events, activities, and milestones with advance notice and at SECTION's cost. Travel expenses have been estimated in the solution budget.

**\*US Headquarters:**
> 1111 W. 22$^{nd}$ Street
> Suite 270
> Oak Brook, IL 60523
> 630-756-2632

**\*\*Montreal Office:**
> 1155 Metcalfe Street
> Office 1537
> Montreal, QC, H3B2V6

**Dubai Office:**
> Building A1, Dubai Digital Park
> Dubai Silicon Oasis, Dubai

**\*India Headquarters:**
> 2nd floor, D Block.SF No.558/2
> Hanudev Infopark Pvt Ltd
> Udayampalayam Road Nava India, Coimbatore
> Pincode: 641028

**\*\*Chennai Office:**
> WorkEZ Urban Square – OMR
> Elango Nagar,
> OMR, Perungudi, Chennai
> Pincode: 600 069

## Strategic Relationships

Wavicle is vendor-agnostic; however, our team members' skills and expertise in various technologies have earned individual certifications as well as partner recognition from Google Cloud, Microsoft (Azure), Amazon Web Services, Snowflake, and Databricks.

Wavicle maintains a contractor network to supplement skills, experience, and capacity as needed. There are no major subcontractors expected to be used for this solution; any contractors will be independently contracted with Wavicle.

## Future, Long-Term Vision, and Strategic Plans

Since its founding in 2013, Wavicle has a history of growth. As a privately-held company, our focus remains on our clients' success. Wavicle's values include always providing clients with transparent, cost-effective cloud data and analytics solutions that increase speed-to -value, reduce risk, and help them make smart, data-driven decisions. It is a priority to maintain skills in current and emerging technologies to support our clients.

## Disaster Recovery / Security Plan

Wavicle-owned hardware is limited to employee and contractor laptops. These owned laptops have encrypted hard drives and use multifactor authentication as well as policies for hardware and software updates. Wavicle uses PaaS and Software-as-a-Service (SaaS) capabilities via multiple cloud vendors, and productivity software is based on Microsoft 365. Typically, our clients ask us to use their laptops, VPN, and/or other remote access capabilities. Wavicle employees and contractors can work at local offices but also have remote work capabilities; thus facility issues do not affect productivity. Wavicle employees are trained annually, at a minimum, on data privacy and security measures.

## Project Team

Key roles on the project team include the Executive Sponsor, Engagement Manager, Solution Architect, and Business Analysts. We do not typically assign an Engagement Manager or Business Analysts until an award is made, and we may hire additional employees into these roles depending on current staffing assignments.

Wavicle's **Executive Sponsor** for this initiative will be **Debbie Sweet**. Her time allocation is anticipated to be 10-20%, depending on the stage of the project.The Engagement Manager will work closely with her to ensure delivery quality.

> Debbie is the Practice Lead for Healthcare & Wellness at Wavicle as well as being a certified Forest Therapy Guide, Group Fitness Instructor, and Advanced Open Water Diver. She holds Bachelor of Arts in Economics and Management and Master of Business Administration in Healthcare Management, along with

the completion of GIS coursework through University of Alaska-Fairbanks and current enrollment in the LSU Master of Library and Information Science program.

As a problem-solver and innovator, Debbie has spent 30 years enabling organizations and teams to achieve strategic objectives through the implementation of process, technology, and culture change. As an advisor, strategist, portfolio/program manager, value architect, or client executive, or something else, Debbie draws upon a broad and always-growing toolbox of consulting and domain knowledge, skills, and experience.

Debbie strives to learn something new every day and help "connect the dots" for a better world and future through active listening. She actively participates in sustainability initiatives through coral reef restoration, beach and ocean cleanups, and rare disease advocacy. Debbie also enjoys learning more about biomimicry, neuroscience, impacts of exercise on the brain, artificial intelligence, and nature's effects on wellness.

Wavicle's **Solution Architect** will be **Jose Ochoa,** assuming the cloud platform is Google. We also have qualified Solution Architects with Azure and AWS expertise if one of those platforms is chosen. His contribution is anticipated to be primarily upfront, with QA checkpoints throughout the project. He will also continue to work with Leads and the Data Architect as needed behind the scenes.

Jose Ochoa is the Google Alliance Lead at Wavicle and brings over 18 years of executive leadership, strategy, and management experience to the team. He is passionate about the role data plays in solving the world's challenges, enabling others to realize their potential, and scaling organizations.

Most recently, Jose was Senior Director of Cloud & Data Strategy in the Google Practice at Publicis Sapient. Prior to Publicis, he led AI/ML Solutions Engineering at Maven Wave, a cloud strategy consulting firm. Jose also possesses strong entrepreneurial experience, having served as COO of a startup that grew to become the nation's largest, and most tech innovative, adult CDL vocational institution. Before that he served as a Senior Associate with McKinsey & Company in New York City where he developed an expertise in strategy and big data. Jose's career started as a high school chemistry and biology teacher with Teach For America in Chicago, where he also founded and coached a cross country team.

Jose received his undergraduate degree in Molecular Biophysics & Biochemistry from Yale University and obtained a Master's in Business Administration from the Kellogg School of Management at Northwestern University. He is also an avid hockey player and musician.

Wavicle's **Engagement Managers** typically have 10-20+ years of experience with project and program management, often working as business or technical analysts prior

that. SECTION would have a full-time, dedicated Engagement Manager for Year 1 (and reduced after that time to reflect the primarily support activities in Year 2).

> The assigned Engagement Manager will have experience with similar scope and scale initiatives, and all have both waterfall and agile engagement experience. As a sidenote, we find the PMP and PgMP certifications to be less indicative of successful delivery than our Engagement Managers' experience with projects using cloud technologies, data and analytics, and agile delivery. Our Engagement Managers are well-respected within Wavicle and have the tools, influence, and support to handle most situations and challenges without escalation; however they have a direct line to the Executive Sponsor and other senior leaders when the need arises.

Wavicle's **Business Analysts** have 3-8 years of academic and/or client project experience in research, analysis, information synthesis, communication, and organization. Depth in one or more domains related to the project (e.g., natural resources, wildlife, conservation, biology) is a preferred qualification, but there are also successful cross-domain Business Analysts. Our Business Analysts also often play the role of scrum master or project coordinator and liaison with our offshore team members to parlay industry or functional knowledge gained from project work. Each of the two Business Analysts would be full-time, dedicated to the project during Year 1 (and one would remain full-time in Year 2).

Additionally, there are several consulting Subject Matter Consultants who would be engaged with the project at varying levels to ensure SECTION is comfortable with our knowledge and work in this space. Wavicle's extended network includes ESRI ArcGIS specialists; Wildlife experts with 10-25 years of experience each (retired university professor, nonprofit executive, Wildlife Biologist); Consultant with 20+ years of experience across Wildlife, Forestry, Recreation, and Conservation; Law Enforcement or Public Administration consultants; Organizational Change Management. For this solution, over 2000 hours of time would be contributed to the project from this pool.

As the scheduling of this 2-year work effort is refined, availability will be reviewed with our network resources, and resumes can be shared with SECTION for informational purposes. Given the competing priorities for qualified resources and the agile approach, it would be difficult to accommodate the need to interview multiple personnel and select resources while maintaining the level of productivity required to implement the solution. However, any concerns SECTION has with any resource assigned to the initiative can be raised for the Engagement Manager to address, and any rotations needed from the Wavicle side would be discussed with the SECTION primary contact.

# ADDENDUM ACKNOWLEDGEMENT FORM
## SOLICITATION NO.: ARFP DNR25*01

**Instructions:** Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

**Acknowledgment:** I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

## Addendum Numbers Received:
(Check the box next to each addendum received)
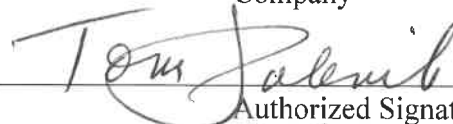
[✓] Addendum No. 1        [  ] Addendum No. 6

[✓] Addendum No. 2        [  ] Addendum No. 7

[✓] Addendum No. 3        [  ] Addendum No. 8

[✓] Addendum No. 4        [  ] Addendum No. 9

[  ] Addendum No. 5        [  ] Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Wavicle Data Solutions, LLC
_____
Company

_Tom Palenik_
_____
Authorized Signature

12/2/2024
_____
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
Revised 6/8/2012

STATE OF WEST VIRGINIA - PURCHASING DIVISION

# VENDOR REGISTRATION AND DISCLOSURE STATEMENT AND SMALL, WOMEN-, AND MINORITY-OWNED BUSINESS CERTIFICATION APPLICATION

Before a vendor is eligible to sell goods and/or services to the State of West Virginia, the *West Virginia Code* §5A-3-12 requires all vendors to have on file with the West Virginia Purchasing Division a completed Vendor Registration and Disclosure Statement. Vendors supplying sole source goods or services to West Virginia state agencies, **or** competitive purchases of $5,000 or less annually in aggregate across all state agencies are required to complete the Vendor Registration and Disclosure Statement (WV-1A form). If the amount for competitive purchases exceed $5,000 in aggregate across all state agencies in any one year, a **$125.00** annual fee is required. Payment of the annual fee includes email notifications on bid opportunities based on the commodities and services selected upon registering in the Vendor Self-Service (VSS) portal at *wvOASIS.gov*. Please complete **Part I** of this form in its **ENTIRETY** and return to the state agency listed below for their completion of **Part II**. The agency will forward this form to the West Virginia Purchasing Division for processing. Incomplete forms may not be processed and may be returned to the vendor. **Please return all correspondence to:**

**STATE AGENCY:** DIVISION OF NATURAL RESOURCES

**ADDRESS:** PROPERTY & PROCUREMENT OFFICE, 324 4TH AVE

**CITY, STATE, ZIP:** South Charleston, WV 25303

Whenever a change occurs in the information submitted, such change shall be reported immediately in the same manner as required in the original disclosure statement (*West Virginia Code* §5A-3-12). Vendors doing business with the State of West Virginia are expected to abide by the **Vendor Code of Conduct** available online at *www.state.wv.us/admin/purchase/vrc/vendorconduct.pdf*.

**Privacy Notice:** The Purchasing Division is required to collect certain information as stated in *West Virginia Code* §5A-3-12, other applicable sections of the *West Virginia Code*, the Vendor Registration and Disclosure Statement forms, and other documents to facilitate the state bidding and contract administration processes. This information is stored in a secure environment, but unless specifically protected under state law, any information provided may be inspected by or disclosed to the public.

Vendors are also required to be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or other state agencies or political subdivisions. Failure to do so may result in delay of or disqualification from a contract award, pursuant to *West Virginia Code of State Rules* §148-1-6.1.7. If you have any questions concerning this *Vendor Registration and Disclosure Statement*, please contact the Purchasing Division at (304) 558-2311.

Questions concerning this Vendor Registration and Disclosure Statement may be directed to the Purchasing Division at (304) 558-2311. Should you need additional information relating to vendor registration, please visit *www.state.wv.us/admin/purchase/VendorReg.html*.

# VENDOR REGISTRATION AND DISCLOSURE STATEMENT AND SMALL, WOMEN-, AND MINORITY-OWNED BUSINESS CERTIFICATION APPLICATION

## PLEASE TYPE OR CLEARLY PRINT ALL INFORMATION
### *To Be Completed by the Vendor and Returned to the Purchasing Division*

1. **Legal Name of Company/Individual** Wavicle Data Solutions, LLC

   **Ordering** Address 1111 W 22nd Street, Suite 270, Oak Brook, IL 60523

   (Please provide a physical address, not a post office box.)

   ☑ Default Ordering Address

   **Payment** Address  1111 W 22nd Street, Suite 270

   City, State, Zip Oak Brook, IL 60523

   Telephone Number 630-756-2632          Fax Number N/A

   Principle Contact Person Tom Palenik          E-mail tom.palenik@wavicledata.com

   Contact's Telephone Number 708-710-2355          Contact's Fax Number N/A

   **DBA, if any**

   **Ordering** Address

   **Payment** Address

   City, State, Zip

   Telephone Number          Fax Number

   Principle Contact Person          E-mail

   Contact's Telephone Number          Contact's Fax Number

2. **Vendor Tax Classification:**

   | | | | |
   |---|---|---|---|
   | ☐ | Individual | ☐ | Government |
   | ☐ | Sole Proprietor | ☐ | Medical Corporation |
   | ☐ | Partnership | ☐ | Attorney Corporation |
   | ☑ | Corporation | ☐ | Non-Profit Organization |
   | ☐ | Board Member | ☐ | Payroll |
   | ☐ | Trust | ☐ | Employee |
   | ☐ | Estate | | |

# VENDOR REGISTRATION AND DISCLOSURE STATEMENT AND SMALL, WOMEN-, AND MINORITY-OWNED BUSINESS CERTIFICATION APPLICATION

## PLEASE TYPE OR CLEARLY PRINT ALL INFORMATION
### *To Be Completed by the Vendor and Returned to the Purchasing Division*

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**3. Taxpayer Identification Number (TIN):** If you have an Identification Number, enter it below. All partnerships, corporations, or companies with employees must have an EIN.

| 6 | 1 | - | 1 | 9 | 8 | 9 | 7 | 6 | 5 | EIN |

### OR

If you do not have a EIN, please enter Social Security number (SSN), Individual Taxpayer Identification Number (ITIN) or Adoptive Identification Number (ATIN) and check the correct below.

| | | | - | | | - | | | | | - (SSN ☐, ITIN ☐, ATIN ☐) |

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### 4. (A) *Small, Women-Owned, Minority-Owned Businesses*

*West Virginia Code* §5A-3-59 establishes a procurement certification program in West Virginia for small, women-, and minority-owned businesses. Requirements related to the certification program are provided in the *West Virginia Code of State Rules* §148-2-1 et seq. Note that this certification provides nonresident vendors preference that is equivalent to competing resident (West Virginia) vendors that have applied for resident vendor preference, in accordance with *West Virginia Code* §5A-3-37. This certification may assist resident small, women-, and minority-owned businesses when soliciting business in other states. If you are renewing your two-year SWAM business certification status, please indicate the appropriate designation below.

**Certification of Status** *(Check all those which apply)*

☑ **Minority-owned Business** [1] means a business concern that is at least fifty-one percent owned by one or more minority individuals or in the case of a corporation, partnership, or limited liability company or other entity, at least fifty-one percent of the equity ownership interest in the corporation, partnership, or limited liability company or other entity is owned by one or more minority individuals and both the management and daily business operations are controlled by one or more minority individuals.

- A "minority individual" means an individual who is a citizen of the United States or a noncitizen who is in full compliance with United States immigration law and who satisfies one or more of the following definitions:

  o **African American** means a person having origins in any of the original peoples of Africa and who is regarded as such by the community of which this person claims to be a part.

  o **Asian American** means a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands, including, but not limited to, Japan, China, Vietnam, Samoa, Laos, Cambodia, Taiwan, Northern Mariana, the Philippines, a U.S. territory of the Pacific, India, Pakistan, Bangladesh, or Sri Lanka and who is regarded as such by the community of which this person claims to be a part.

  o **Hispanic American** means a person having origins in any of the Spanish-speaking peoples of Mexico, South or Central America, or the Caribbean Islands or other Spanish or Portuguese cultures and who is regarded as such by the community of which this person claims to be a part.

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○ **Native American** means a person having origins in any of the original peoples of North America and who is regarded as such by the community of which this person claims to be a part or who is recognized by a tribal organization.

# VENDOR REGISTRATION AND DISCLOSURE STATEMENT AND SMALL, WOMEN-, AND MINORITY-OWNED BUSINESS CERTIFICATION APPLICATION

### PLEASE TYPE OR CLEARLY PRINT ALL INFORMATION
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☐ **Small Business** [2] means a business, independently owned or operated by one or more persons who are citizens of the United States or noncitizens who are in full compliance with United States immigration law, which, together with affiliates, has two hundred fifty or fewer employees, or average annual gross receipts of $10 million or less averaged over the previous three years.

☐ **Women-owned Business** [3] means a business concern that is at least fifty-one percent owned by one or more women who are citizens of the United States or noncitizens who are in full compliance with United States immigration law, or in the case of a corporation, partnership or limited liability company or other entity, at least fifty-one percent of the equity ownership interest is owned by one or more women who are citizens of the United States or noncitizens who are in full compliance with United States immigration law, and both the management and daily business operations are controlled by one or more women who are citizens of the United States or noncitizens who are in full compliance with United States immigration law.

### (B) Other Federal Designations

Additionally, by providing the following information, I represent that this enterprise is a small business as defined by the *Code of Federal Regulations,* Title 13, Part 121, as appended - which contains detailed industry definitions and related procedures - and/or the characteristics of the enterprise's control, operation and/or ownership are accurately reflected in the information provided. *Check all that apply.*

☐ Disabled Small Business Ownership [4]

☐ Veteran Small Business Ownership [5]

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**5. Commodity Codes:** You may register for commodity codes for the products and services that you offer, which will provide you with bid opportunity alerts and notifications should you become a paid registered vendor. To perform this function, visit the Vendor Self-Service (VSS) portal at *wvOASIS.gov*.

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**6.** What is the latest Dun & Bradstreet number and rating on the vendor (https://www.dnb.com/duns/duns-lookup.html)? 08-036-7486

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**7.** Is the vendor acting as an agent for some other individual, firm or corporation? If yes, attach statement of the principal authorizing such representation.    ☑ **No**    ☐ **Yes**

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By signing below and submitting this form, the vendor certifies and acknowledges that: 1) it has obtained all licenses, certifications, and authorizations necessary to lawfully conduct business in the state of West Virginia; and 2) that the assertions made by completing this form and delivering it to the Purchasing Division are accurate and true in accordance with the applicable law and rules. As authorized agent of the vendor named herein, I do solemnly swear that the above information is true and complete, in accordance with *West Virginia Code* §5A-3-12(e).

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In the event that the vendor is applying for certification as a small, women-, or minority-owned business, the vendor's signature below further certifies that: 1) the state in which the vendor has its headquarters or principal place of business does not deny a like certification to a West Virginia based small, women-owned, or minority-owned business; 2) the state in which the vendor has its headquarters or principal place of business does not provide a preference to small, women-owned, or minority-owned firms that is unavailable to West Virginia based businesses; and, 3) that it has read and understands this form, along with the law and rules governing certification as a small, women-owned, or minority-owned business.

Tom Palenik

_Authorized Agent of Vendor (Print Name)_

_Authorized Agent (Signature)_

Director of Business Operations

_Title_

December 2, 2024

_Date_

<table>
<tr><td colspan="2" align="center"><strong>PURCHASING DIVISION<br>USE ONLY</strong></td></tr>
<tr><td>Vendor ID:</td><td></td></tr>
<tr><td>Check No. :</td><td></td></tr>
<tr><td>Memo No. :</td><td></td></tr>
<tr><td>Date:</td><td></td></tr>
<tr><td>Entered by:</td><td></td></tr>
</table>

# VENDOR REGISTRATION AND DISCLOSURE STATEMENT AND SMALL, WOMEN-, AND MINORITY-OWNED BUSINESS CERTIFICATION APPLICATION

### PLEASE TYPE OR CLEARLY PRINT ALL INFORMATION
*To Be Completed by the Vendor and Returned to the Purchasing Division*

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### Part II: FOR STATE USE ONLY - To Be Completed by State Agency and Returned to Purchasing Division

**1.** Please provide a concise description of the goods and/or services the vendor is providing with your specific transaction.

Online database information retrieval systems - Wildlife Resources Custom CloudDatabase

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**2.** Cite the corresponding exemption code from Section 9 of the Purchasing Division Procedures Handbook, if applicable.

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**3.** Are the goods and/or services considered sole source?    ☐ **No**    ☐ **Yes**

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4. Will the goods and/or services provided by this vendor exceed $5,000 in aggregate across all state agencies? If not, and an award under this dollar threshold is pending, please refer to WVREGEX in *wv*OASIS for a processing code to use on your *wv*OASIS award document.

☐ **No**    ☐ **Yes**

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| | |
|---|---|
| *State Agency Procurement Officer Signature* | *Date* |
| *Telephone No.* | *FAX No.* |

**Return to: WV Purchasing Division**
**Vendor Registration**
**2019 Washington Street, East**
**Charleston, WV 25305-0130**

**DESIGNATED CONTACT:** Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

DEBBIE SWEET, HEALTHCARE & WELLNESS PRACTICE LEAD
(Name, Title)

Debbie Sweet, Healthcare & Wellness Practice Lead
(Printed Name and Title)

111 W. 22ⁿᵈ Street, Suite 270, Oak Brook, IL 60523
(Address)

630·756·2632
(Phone Number) / (Fax Number)

Debbie.Sweet @ wavicledata.com
(email address)

**CERTIFICATION AND SIGNATURE:** By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

WAVICLE DATA SOLUTIONS, LLC
(Company)

Tom Palenik  Director of Business Operations
(Authorized Signature) (Representative Name, Title)

TOM PALENIK, DIRECTOR OF BUSINESS OPERATIONS
(Printed Name and Title of Authorized Representative)

12/2/2024
(Date)

(PH) 708·710·2355
(Phone Number) (Fax Number)