System Design and Management Plan for SHPO's Geographic Information System

Final Report

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Version 1.0

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Table of Contents

Overview....1
User Requirements....2
Challenges....3
Data Processes....3
Data Input....4
Data Update....4
Data Viewing....5
Database Development....7
Data Migration....7
Database Views....7
Personnel Requirements....8
Web / Database Programmer....8
GIS Specialist....8
Future Directions....8
Tabular Data – Non-Spatial Tasks....9
Mapping Tasks – Spatial Tasks....9
Appendices....13
APPENDIX A: FY 2007 Proposal and Estimated Costs....13
APPENDIX B: 2005 Deliverables....15
APPENDIX C: Database Activities Report (January 2006)....17
APPENDIX D: Database User Specifications....18
APPENDIX E: Database Scoping Report (March 2005)....19
APPENDIX F: Relationships between SHPO Databases....26
APPENDIX G: Database Schema....27
APPENDIX H: Database Migration Plans....40
APPENDIX I: WVbasemap Data Layers....49
APPENDIX J: GIS Database Evaluation Report....51

Overview

The West Virginia GIS Technical Center (WVGISTC) at West Virginia University is assisting the State Historic Preservation Office (SHPO) in collecting, maintaining, and displaying its digital tabular and spatial databases, collectively referred to as SHPO's geographic information system (GIS). These databases include historic architectural and archaeological site and survey data for the state of West Virginia.

The purpose of an Internet-based geographic information system is to make the State's historic resource information available to the public to promote historic preservation awareness and to improve the quality of development decisions throughout the State. The system will also allow SHPO to comply with the Section 106 amendment which requires that federally funded projects must be reviewed to ensure that no historic sites are impacted.

The digital storage, editing, and dissemination of SHPO's cultural and archeological resources via the Internet will provide the following benefits:

- Allow remote access
- Streamline collection efforts
- Enhance users ability to query resources
- Make available online maps and documents
- Improve integrity of databases
- Reduce amount of time and money needed to complete new projects
- Improve quality of decision making for projects
- Promote historic preservation awareness to public

Existing Programs

With the passage of the National Historic Preservation Act in 1966, the National Park Service was appointed to work with the state historic offices to maintain the National Register of Historic Places. Except for this nationwide program, few national guidelines or standards exist regarding the collection, storage, and dissemination of historic data. Several years ago the National Park Service's Cultural Resource GIS facility created an ArcView (ESRI) GIS program called MAPIT to help states manage their geographic databases, but the National Park Service no longer supports this now obsolete application.

Although every state has set up their information systems differently, it is helpful to review other state historic office applications for designs that the West Virginia SHPO may want to emulate. Such applications worthy of review include Illinois' geographic information system named HAARGIS and Florida's electronic recording forms.

User Requirements

The following user requirements should be implemented in the proposed computerized system to allow users to maintain and view resources.

Paper to Digital: Shift from a paper-based to electronic data system for managing and disseminating information.

Geographic Information System: Implement a geographic information system which spatially references resources.

Relational Database Model: Employ a relational database model to reduce the occurrence of data anomalies and poor data integrity for SHPO's nine tabular databases. Determine data schema and user requirements of master databases maintained by SHPO staff, which could have a similar interface and physical structure as the proposed electronic recording forms.

Electronic Data Submission: Streamline data collection efforts with new protocols and applications for off-site consultants by allowing them to capture and submit their tabular reports and mapping files to SHPO for inclusion into the statewide master databases. From SHPO's website, consultants can download forms and procedural documents associated with electronic data submission. A database utility program imports consultants' compiled data into the statewide master databases maintained by SHPO

Digital Document System: Improve information access and productivity by creating a digital document management system for selected archival documents.

Remote Data Access: Allow users to access data resources from remote locations via the Internet.

Multi-User Access: Provide multi-user access to tabular and mapping databases over a client/server network.

Customized Data Views: Allow users to create customized data views of tabular forms/reports and maps in an intuitive, easy manner. Permit users to edit tabular databases consisting of multiple tables in either a form or tabular view. Provide users the ability to query resources which are linked to resource summary reports, archival documents, and a printable map of the feature.

System Maintenance: Develop a system that is stable, scalable, highly available, and maintained by technology personnel on site.

Challenges

The SHPO databases and associated documents are quite large and complex. Migrating from the current system to a geographic information system includes several challenges.

- Migrating data from paper-based or non-normalized Lotus Approach tables to a relational database model
- Displaying and editing data from multiple tables
- Ensuring electronic recording and master database forms are similar in design and structure
- Creating application interfaces which meet user requirements and data availability
- Higher demand for personnel with technology backgrounds
- Increased demand in computing resources (paperless to digital – fewer file cabinets, more computers and software)

Data Processes

The flow of data for SHPO's information system can be subdivided into three categories: data input, data update, and data viewing; in turn, six major system components support these data processes (Figure 1). The system components can be further subdivided by whether it processes tabular or mapping data. Table 1 lists the different data processes and system components.

Table 1. Data processes and system components

Data Processes	System Components	Tabular	Mapping
DATA INPUT	(1) Electronic Recording Forms	X	
	(2) Map File Submissions		X
DATA UPDATES	(3) Master Database Management System	X	
	(4) GIS Mapping Management System		X
DATA OUTPUT	(5) Document Server	X	
	(6) Map Application Server		X

Data Input

Consultants follow guidelines to submit tabular and mapping data to the SHPO central office for inclusion into the master databases. Staff can also directly input data into the system.

(1) Electronic Recording Forms: To submit data to the relevant master databases, consultants use either standalone electronic recording forms (smart forms) or Web-based forms which have fields identical to the master databases. Reference documents are submitted along with the electronic forms and then made accessible on the document server via the Internet.

(2) Map File Submissions: In accordance with prescribed guidelines, mapping information is submitted to the GIS specialist for inclusion into the statewide mapping databases.

Data Update

The data managements system consists of the tabular databases, which primarily contain non-spatial information and the geographic databases, which record spatially referenced information. A unique identifier links the geographic and tabular data (attributes).

(3) Master Databases Management System: Cultural and archeological tabular data and log files which track these resources are maintained in one of nine SHPO databases. Databases can be subdivided into two groups: 1) review and compliance and related databases and 2) national register and related databases. These databases are related to one another through tables and can reside in a single, enterprise relational database.

Table 2. SHPO utilizes nine databases to meet mission goals.

Review and Compliance and Related Databases	**National Register and Related Databases**
Review and Compliance	National Register
Archaeological Bibliography/Survey	Grants
Archaeological Sites*	Tax
Architectural/Historical Inventory*	Certified Local Government (CLG)
Cemetery	

* Electronic recording forms needed

Section chiefs maintain the relational databases and employ a database utility application to transfer data from the consultants' electronic recording forms to the appropriate database table. The section heads utilize another database function to generate a single table with key attributes for linkage to the mapping files. The section chiefs also post

electronic forms, reports, and archival documents onto the document server. Customized database forms allow section chiefs to perform selection and update queries.

(4) GIS Mapping Management System: GIS specialists maintain the geographic databases using a customized mapping application. Statewide GIS files are periodically published to the mapping server. A new application should replace the obsolete, unsupported National Park Service's MapIT program. The mapping application should have the following functions:

- Zoom to county, town, or USGS 7.5' minute quadrangle
- Print 8.5 x 11 inch maps

A mapping database is needed for each of the following major database tables: National Register, Architectural/Historical Inventory, Archeological Sites, and Archeological Surveys. Using a common identifier, GIS specialists link spatially referenced data to a single "flat file" of attribute data from the section chiefs' data tables. Some features of the geographic databases:

- Features represented as polygons or points. Lines will be buffered to create polygons.
- Polygon features must have topological relationships and account for overlapping features.
- Features must have a corresponding, standardized, unique identifier.
- Geographic databases are linked to a single table of attributes.
- Geographic databases must have the same projection and datum.
- Geographic databases must be of a statewide extent.

Data Viewing

Authorized users access forms, maps, and archival documents through customized Internet applications. The document and map application servers are linked together, allowing users to query both tabular and spatial information using either the document solution or mapping applications. Output products include electronic maps and reports which can be printed or downloaded. In the future, GIS programs can be written to generate visually appealing map books and other products from SHPO's geographic information system.

The type of user determines the amount of access to SHPO datasets. The public is permitted access to the National Register (except restricted sites), Architectural/Historical Property, and Archeological Survey tables. Consultants are permitted access to specific resource databases. SHPO personnel are the only members which can access the log databases.

(5) Document Server: The document server stores all the electronic documents (e.g., individual resource reports, scanned documents, pictures). The tabular information is

organized by the type of resource and located by a geographical index and unique identifier. A query builder application can be created to allow users to locate information quickly.

(6) Map Application Server: The geographic files and several key attributes (e.g., feature name, feature identifier, address) are accessed from the map application server. Like the document server, each individual resource is located by a unique identifier. Existing viewer applications like those on the statewide MapWV GIS services portal (http://www.mapwv.gov/) should expedite the development of SHPO's Internet map application.

Table 3. Summary of data processes

- **DATA INPUT** from off-site consultants. Consultants electronically submit completed forms, reports, pictures, and mapping information to SHPO office personnel.
  - *Field tabular data* is collected and submitted electronically via the Internet, using either a *smart form*, a standalone electronic recording application, or a *web-based form*. Both formats capture data off-site into a temporary database which is eventually uploaded into the master databases.
  - Photographs and other *archival documents* are submitted electronically according to predefined procedures.
  - *Mapping data* is submitted electronically according to prescribed standards to update its *geographic databases.*

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- **DATA UPDATE** of resources by on-site personnel.
  - Paper-based data and Lotus Approach table data migrated to relational databases.
  - SHPO Section Chiefs update the appropriate tables from the consultants' electronic recording forms.
  - Section Chiefs catalog *archival documents* with the appropriate unique identifier and upload these documents to the *document server*.
  - GIS Specialists update the *geographic databases* from mapping information collected by the consultants. This includes linking the mapping and tabular data together into a single table.
  - The tabular databases are maintained on an enterprise relational database server like SQL Server. All archival documents are maintained on document servers. All geographic files are maintained on mapping application servers.
  - Mapping features are linked to non-spatial data with a unique identifier.

⇩

- **DATA VIEWING** of resources by in-house and off-site users.
  - Users access resources through non-spatial or spatial queries. The type of access depends on their user profile as a staff member, consultant, or general public.
  - The tabular databases are maintained on an enterprise relational database server like SQL Server. All archival documents are maintained on document servers. All geographic files are maintained on mapping application servers.

Database Development

The development of the master database application and customized interfaces is an essential component of the overall system implementation. A key performance measure is achieved when SHPO staff members are using the new relational databases in their daily work routines. In addition, the staff should have ability to update their master databases with field information submitted by consultants, post database reports to the document server, and connect to map information associated with each resource.

Data Migration

Data migration involves converting the existing SHPO databases in Lotus Approach tables or paper format to a relational database system. To assist with the database conversion, a scoping report was created to document the purpose, unique identifiers, and attributes associated with each SHPO database (Appendix E). SHPO personnel also provided input regarding the physical layout or schema (Appendices F-G) of the databases. The schemas are a graphical depiction of the database structure, denoting properties such as table and field names, field widths, field types, unique identifiers, and relationships between tables. Additional migration documents were created to depict the transfer of data from the old structure to new structure (Appendix H). More work is needed to complete the data migration for certain databases.

Database Views

Prototypes were created for viewing, searching, and maintaining the databases. Multiple users must be able to view and edit the databases from a singe form. A program must also be available to SHPO staff to ingest the consultants' electronic data into the master database.

Some SHPO staff provided user case scenarios as to how the data should be viewed, queried, edited, and displayed depending on their user profile (Appendix D). Certain requests are not feasible unless additional data is collected or formatted in a suitable manner.

Personnel Requirements

Staff will need to have specialized skills to maintain and modify the tabular and spatial databases and applications. Select personnel will need to manage the hardware resources and software licenses. In-house support people will need to be familiar with the physical design and functions of the cultural, archeological, and log databases.

Web / Database Programmer

Database programmers are responsible for the standalone and online application programs which allow multiple users to query, update, and view resources stored in the master SHPO databases. Modifying any of these programs will require computer programming skills. In addition, this person should be able to publish Web pages that provide help about the system and links to downloadable files.

GIS Specialist

A GIS specialist is required to mange all the spatial data associated with the databases. This person is responsible for collecting, editing, and posting geographic files to the mapping servers. The GIS specialist must also link the mapping files to other tabular data fields maintained in the master databases.

Future Directions

Because it involves processes of an entire department, the scope of this project is quite large and complex. It should be divided into a number of sub-projects which correspond to each of the six major system components (Figure 1; Appendix A). Certain system components are still in the conceptualization phase; prototypes should be created and thoroughly tested before system wide implementation. A “dummy” version of the website should be completed to demonstrate the Web component of the project. It is also important that system components are scalable and complement one another.

Designing a geographic information system takes many skills: design, GIS, management, people, organization, programming, and database administration. Active involvement, feedback, and coordination from SHPO personnel are essential for the project to advance. Use case scenarios are necessary to capture existing work flows and define the data,

interaface, and application. Often this is an iterative process, whereby project goals are defined, conceptual and physical models are elaborated, leading to the construction and eventual deployment of system components. A successful system implementation occurs when all predefined project goals are met, system components are operational, and the system is utilized on a regular basis.

Major accomplishments of the initial phase of the conversion project include this high-level system plan and the migration of SHPO databases to a relational databases format (Appendix C). Recommendations for future development, subdivided by tabular (non-spatial) and mapping (spatial) tasks, are listed below. See Appendix A for estimated costs.

Tabular Data – Non-Spatial Tasks

- Electronic recording forms or Web-based forms must be developed in conjunction with the master databases to record consultant data.
- Database schemas for relational databases and relevant forms should be finalized before beginning comprehensive development of any document submission applications.
- Use cases and user interface specifications which capture existing work flows are needed for all databases. SHPO should be cognizant that numerous enhancement requests may extend completion of the project.
- Data migration must be completed for each database, along with an acceptable user interface, before SHPO personnel can transition to new system.
- Query builder applications must be created that are similar in design and function for database, document, and map servers.
- Design and employ a document server for scanned documents and pictures.

Mapping Tasks – Spatial Tasks

- Revise submission guidelines for mapping data.
- Replace the current GIS management program with a newer version which accesses more current and accurate base mapping layers.
- Reconcile the GIS files and tabular databases through a common identifier.
- Develop a mapping application accessible via the Internet.

Table 4. Actions taken during initial phase of project and recommendations for future project phases.

System Component	Actions Taken	Recommendations
TABULAR DATA		
Electronic Recording Forms	▪ Created a prototype electronic recording form using Microsoft Access Database Development Kit and Visual Basic .NET programming	▪ Guidelines required for all electronic document submissions ▪ Form should be similar in design as master database forms. ▪ More testing needed to determine best approach for standalone forms. ▪ Test if alternative Web-based forms are a viable option. ▪ Electronic recording forms cannot be finalized until the database schema is completed. ▪ Determine who will maintain and update the forms.
Tabular Database Management System	▪ Completed Scoping Report ▪ Designed and created relational database schemas for nine SHPO databases. ▪ Where data available, populated SHPO databases in a relational database format. ▪ Created prototype user interfaces using Access tools and macros. User interface did not meet all of users' requirements. ▪ Created user interfaces using Visual Basic format. ▪ Created prototype resource summary reports ▪ Discovered it is more challenging to create editing functions for multiple tables than for single table.	▪ Determine if the smaller databases can be supported by personalized databases like Access. ▪ Determine which databases should be supported by an enterprise database like SQL Server. ▪ Identify all use case and user interface requirements for all databases. ▪ A written report is needed from SHPO about how review and compliance procedures should be captured in an electronic database system. ▪ Database programs are needed for appending electronic recording form data to master databases and for creating single tables of attribute data for the GIS files. ▪ Identify the database programmer who will maintain and update the database interface and applications.
Document Management Solution	▪ Conceptual stage of development. Received some scanned documents from SHPO for testing.	▪ Post existing scanned documents on a server, organized by database and unique identifier. ▪ Create a query builder application on server which links to mapping applications.

System Component	Actions Taken	Recommendations
MAPPING DATA		
Map File Submissions		▪ Generate new guidelines for the electronic submission of mapping data.
GIS Mapping Management System	▪ GIS databases evaluated and report generated (Appendix J).	▪ A replacement mapping application needs to be developed in ESRI ArcGIS 9.x. ▪ Mapping application should access new statewide mapping layers ▪ Link appropriate mapping and geographic databases via common identifier. ▪ Mapping layers should be spatially referenced to projection UTM Zone 17 and NAD83 datum.
Map Application Server	▪ Base map viewer applications created by WVGISTCS which can server as a framework for SHPO mapping application. See mapWV.gov	▪ Mapping application should be similar to Illinois' HAARGIS application. ▪ Create a query builder application on server which links to document server.

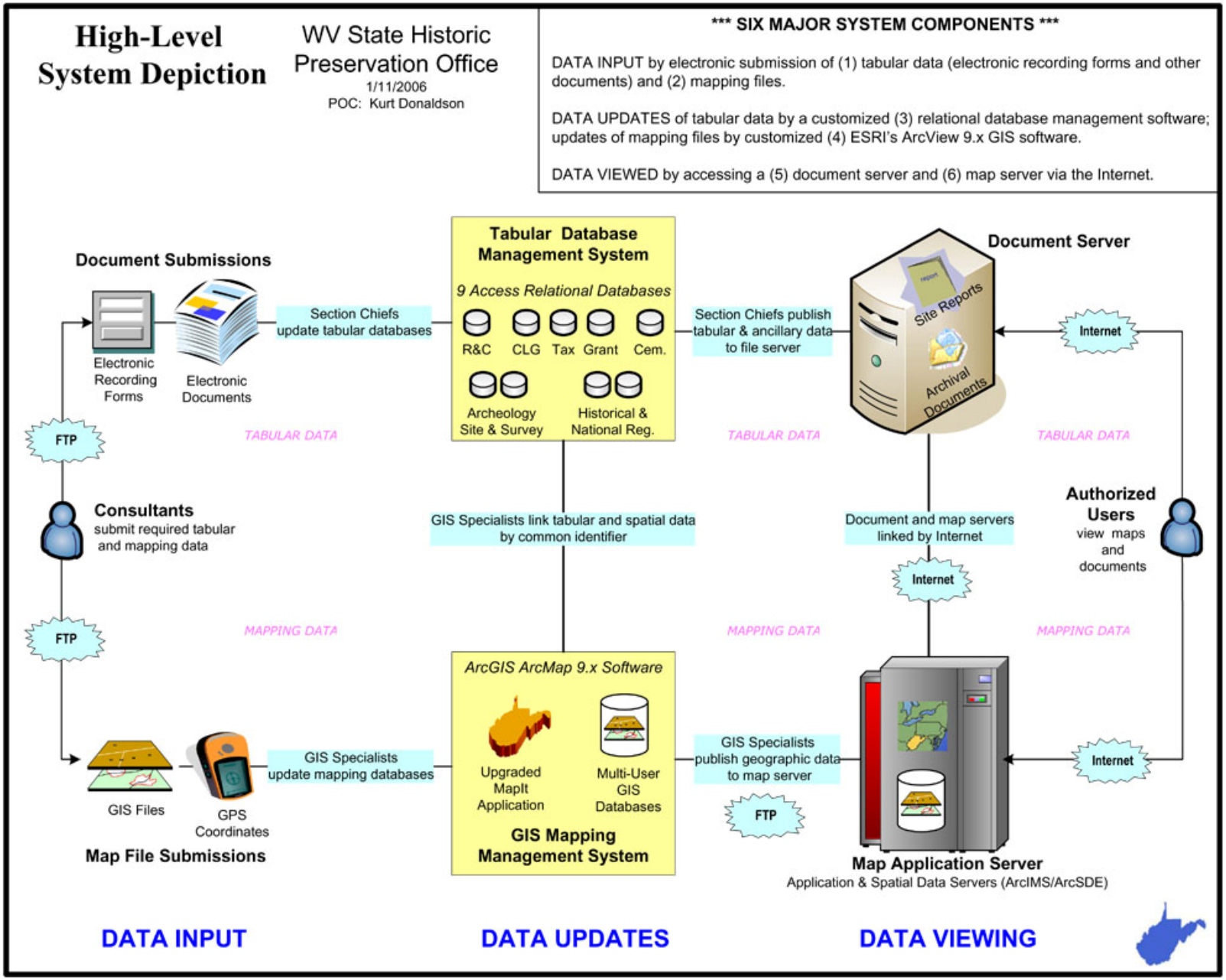


Figure 1. High-level system diagram

Appendices

APPENDIX A: FY 2007 Proposal and Estimated Costs

The State Historic Preservation Office (SHPO) desires to implement a geographic information system (GIS) to collect, maintain, and display its tabular and spatial databases. These databases include historic architectural and archaeological sites and surveys for the state of West Virginia.

The purpose of an Internet-based geographic information system is to make the State's historic resource information available to the public to promote historic preservation awareness. It will improve the quality of decision-making concerning development throughout the State. The system will also allow SHPO to oversee the mandated Section 106 amendment which requires that any federally funded projects must be reviewed to ensure that no historic sites are impacted.

The proposed system consists of six major components. Below each component is explained along with the estimated implementation cost.

Table A1. Data processes and system components

Data Processes	System Components	Estimated Costs
DATA INPUT	(1) Electronic Recording Forms	$20,000
	(2) Map File Submissions	$10,000
DATA UPDATES	(3) Master Database Management System	$85,000
	(4) GIS Mapping Management System	$15,000
DATA OUTPUT	(5) Document Server	$15,000
	(6) Map Application Server	$50,000
	Total	**$195,000**

(1) Electronic Recording Forms: To capture tabular data into the relevant master databases, consultants use electronic recording forms (smart forms) which have the same fields as the master databases. Archival documents are submitted along with the electronic forms and published on the document server. **Estimated cost for creating standalone (or Web) electronic recording forms: $20,000.**

(2) Map File Submissions: In accordance with prescribed guidelines, mapping information is submitted to the GIS specialist for inclusion into the statewide mapping databases. **Estimated cost for generating map file submission guidelines: $10,000.**

(3) Master Databases Management System: Cultural and archeological tabular data and log files which track these resources are maintained in one of nine SHPO databases. Databases can be subdivided into two groups: review and compliance and related databases; and national register and related databases. Customized database forms allow section chiefs to perform selection and update queries. **Estimated cost for migrating data to new relational databases which include customized user interfaces: $85,000.**

(4) GIS Mapping Management System: GIS specialists employ a customized mapping application to maintain the geographic databases, in which statewide GIS files are periodically published to the mapping server. A new application needs to be written to replace the National Park Service's MapIT program, since the MapIT program is obsolete and no longer supported by the National Park Service. **Estimated cost for creating new GIS mapping management system: $15,000.**

(5) Document Server: The document server stores all the electronic documents (e.g., individual resource reports, scanned documents, pictures). The tabular information is organized by the type of resource and located by a geographical index and unique identifier. A query builder application can be created to allow users to search on and locate information quickly. **Estimated cost for creating document management solution and installing server: $15,000.**

(6) Map Application Server: The geographic files and several key attributes (e.g., feature name, feature identifier, address) are accessed from the map application server. Like the document server, each individual resource is searched and located by its unique identifier. Existing viewer applications like those on the statewide MapWV GIS services portal (http://www.mapwv.gov/) should expedite the project. **Estimated cost for creating map viewer application installed on map server: $50,000.**

APPENDIX B: 2005 Deliverables

Table B1. Deliverables and Costs.

#	DELIVERABLES	COST
1.0	**SYSTEM DESIGN**	**$5,000**
1.1	IMPLEMENTATION PLAN – Develop a plan for implementing a successful web-based GIS system.	$4,000
1.2	REVIEW OTHER STATES INFORMATION SYSTEMS – Review systems of other state historic preservation offices that may be worth emulating.	$1000
2.0	**ACCESS DATABASE DEVELOPMENT**	**$17,000**
2.1	DATABASE OUTLINE DOCUMENT – Define the mission/purpose of each database; capture SHPO data management processes, key database features (vital information), and highlight specific SHPO requests.	$2,000
2.2	REVIEW EXISTING SHPO DATABASES – Review existing SHPO database files, formats, and data entry forms; communicate with user staff to define fields, dropdown choices, etc. Recommend SHPO procedural changes that would improve data quality (e.g., selecting one county as primary by centroid and then listing other counties as secondary). Create additional fields as necessary to collect the requested information in a normalized fashion.	$2,000
2.3	DATABASE SCHEMA DOCUMENT – Document the overall structure of the database tables. This includes defining relationships among multiple tables and characteristics of every data element.	$2,000
2.4	POPULATE ACCESS DATABASES – Populate normalized Access tables with sample data. Convert existing data in Lotus Approach format to Microsoft Access using database queries.	$4,000
2.5	NATIONAL REGISTER DATABASE – Download and integrate extensive National Register database from National Park System into SHPO's Access database management system.	$3,000
2.6	FORMS – Develop prototype data entry/editing forms for nine SHPO Access databases.	$2,000
2.7	SUMMARY / RECORD REPORTS – Identify reports needed for each database.	$1,000
2.8	USER EVALUATION – Conduct a user evaluation session of data entry functions.	$1,000
3.0	**ELECTRONIC RECORDING FORMS**	**$5,000**
3.1	FORMS – Create electronic recording forms for the following databases: architectural survey and archaeological sites.	$4,000
3.2	USER EVALUATION – Conduct a user evaluation session of electronic forms and functions.	$1,000
4.0	**GIS FILES**	**$5,000**
4.1	EVALUATION REPORT – Evaluate completeness of existing SHPO GIS files. Recommend suitable formats for linking GIS files to tabular databases.	$300
4.2	TECHNICAL SERVICES – Provide technical support to convert GIS files to the proper format.	$4,000
4.3	UNIQUE ID REPORTS – Generate reconciliation reports to check common identifiers between geographic and tabular databases	$400
4.4	SPATIAL DATABASES – Provide new base layers to SHPO for capturing geographic information.	$300

Table B2. SHPO Responsibilities.

#	SHPO RESPONSIBILITIES
1.0	**SYSTEM DESIGN** – Provide goals and objectives for implementing web-based GIS system.
2.0	**ACCESS DATABASE DEVELOPMENT**
2.1	**DATA ENTRY** – Where necessary, enter information manually into relational databases.
2.2	**DATABASE REPORTS** – Provide specifications for desired reports.
3.0	**ELECTRONIC RECORDING FORMS –** Document procedures on SHPO website for downloading and using electronic recording forms.
4.0	**GIS FILES** – Ensure GIS files are complete and unique identifiers are correct and correspond to tabular data identifiers.

APPENDIX C: Database Activities Report (January 2006)

Nicole Edwards SHPO Database Activities since October 10, 2006

SHPO Database Work Status January 10, 2006			
Database Name	# fields /# tables (as of 1/10/2006)	Status as of 10/5/2005	SHPO Contacts
Archaeological Bib/Survey	21/6	• Draft database done (MSACCESS). Needs final checks by NTE. • Not sent to SHPO yet—was set aside due to priority of archeological and historic property databases.	Tami Koontz L. Lamarre
Archaeological Sites	207/4	• Schema updated as needed. • Finished review of existing data for conformity to schema and relational database principles. Sent to T. Koontz 11/21/05. • Preliminary data entry forms created in MSACESS.	Tami Koontz L. Lamarre
Cemetery	91/4	• Sent e-mail (6/20/2005) to L. Lamarre and C. Kender outlining the changes needed to the existing data to conform to the new database schema. • Draft database forms developed. • Received email 10/21/05 from C. Kender requesting additional changes to this database structure, dropdowns, etc. Set aside due to priority of archeological and historic property databases.	Tami Koontz L. Lamarre C. Kender
CLG	22/2	• Draft database sent to SHPO (April/May 2005). • Awaiting comments.	Tami Koontz
Grant	35/3	• Draft database sent to SHPO 8/3/05. • Awaiting comments.	Tami Koontz
Historic Property Inventory	58/7	• Draft database sent to SHPO on 9/30/05. • 11/7/05- Updated draft database completed for Tech Center review and advanced programming. Included report for single property.	Tami Koontz E. Riebe A. Rowe
National Register	74/25	• Draft database sent to SHPO May 2005. • Was unclear how it would be used. • Right now it simply contains all records available from NRIS at that time. • Awaiting comments.	Tami Koontz E. Riebe A. Rowe
Review and Compliance	48/4 (not structurally sound)	• Draft schema is done. • Unclear how to bring into relationally correct form.	Tami Koontz S. Pearce
Tax	74/6	• Draft database sent to SHPO 8/18/05. • Included requested reports. • J. Murdock provided a comment that it would be nice to be able to filter by all form fields. • Awaiting comments from SHPO employees.	Tami Koontz J. Murdock (no longer w/SHPO)

APPENDIX D: Database User Specifications

Potential Use Case Scenarios for GIS: National Register and Historic Architecture Inventory (also referred to as Historic Property Inventory). Use case scenarios from Historical Property Section. Blue text responses from database developer, Ms. Nicole Edwards

User	Potential uses
Staff (internal use)	· Enter address to determine if the resource has been documented in the inventory. If so, would like to have links to all database information associated with the resource, including the mapped location, and any PDF files associated with resource. Not sure that the address fields as they are set up in the databases would allow this kind of searching. Sometimes they are just a road name, or directions. · Enter a street address to determine if the resource has been listed in the National Register. If so, we would like to see the search results show links to PDF files, jpegs, and a display of the mapped location (and the ability to zoom in and out). Also, would like to see all other information associated with property (such as, did the property receive a grant or tax credit, etc.) Requires linking multiple tables together. · Determine how many transportation-related (or any other possible theme) resources have been documented in the inventory and see on map where they are located (Query such resources in the database and view the resulting mapped locations). Not sure if this is possible. In the NR database there is a field for resource type, which has these choices "building, district, object, site, structure"—there is no "theme" field. For the Hist Prop Inv database there is a field for resource type with these choices "Building, Object, Site, Structure." May not be possible to plan or query a given theme when the data is not in the database? · Query a certain architect to determine how many buildings documented in the inventory they have designed. Being able to do this assumes that the architects have been entered in a standardized format—looking at the architect information in both databases, this does not appear to be the case. · Search the OCR text of all National Register PDF files to determine if any refer to a certain individual. May not be within the scope of this project. · Determine how many Queen-Anne style houses have been documented in Kanawha County. See all database information relating to the properties and mapped locations. Architectural style field contains this info for the Hist Prop Inv database and NR. · View a map to determine if any resources were documented along a county route in rural county. If so, what are the properties? Are there photographs or additional information that accompany them? Not sure what info would be used from the database on this—street address? I don't think the data collected is up to this level of work.
General Public	· Determine if a resource has been documented in the inventory or listed in the National Register by querying address or viewing map. More emphasis on addresses than reported in initial scoping reports. · Search National Register nominations by town, address, or name of property and have ability to print all information in print-friendly format. A very nice idea, but the NR database I did does not include nominations, just properties that are already in the database. I'm not sure which field in which database would provide information that a property was nominated.
Consultants	· Use a map to zoom in on specific area of a county and compare to their project area to determine if there are any resources in the area that are listed in the National Register or documented in the inventory. If so, click on links to all information relating to those properties (database info, PDF, etc.). The accuracy of this will depend on having the right coordinates, which as we know from the NR database, is not often the case. Many are missing in both databases. · Send new architectural survey information to the SHPO via a web portal. I'm thinking this is different from the smart forms? Smart forms are not web based.

APPENDIX E: Database Scoping Report (March 2005)

SHPO Database Conversion Project
Database Summary as of March 28, 2005

A. REVIEW AND COMPLIANCE AND RELATED DATABASES

I. Review & Compliance *(Tracks Section 106 activity and reporting on findings)*

1. Currently 19 separate files with the same fields, each for a different year. SHPO will combine it all into one file. This database records all Section 106 activity and tracks whether reports on findings have been completed.
2. Section 106 is a federally mandated program that requires anyone using federal monies to send a project description to SHPO for review to make sure the plans do not adversely impact any historic cultural resources. The review and compliance database is a tracking database of all requests for review. If a request comes in for an area that may have potential archaeological significance and the area has not been surveyed before, SHPO requests that a Phase I report (foot survey of property, shovels tests, etc.) be done. If anything is found, then a more in depth Phase II report is requested and possibly a Phase III report. The surveyed areas are mapped on topographic maps using the assigned FRNum. If any actual archaeological sites are found and documented in the reports, then they are mapped on the topographic maps using the Archaeological SiteNum. This also applies to the architectural information; architectural survey forms (Historic Preservation Inventory - HPI) may be requested for structures located in the area affected by the project. These are then added to the architectural survey database. Since SHPO has records of NR sites listed in the project area, no additional NR info is requested.
3. The Rev2005.dbf file that was provided is an example of the database for one year. Field descriptions were provided on 1/5/05 in an excel file called R&Cdb_description_new.xls. There was an older description file, but it can be deleted. There were differences between the old and new file, but SHPO has indicated the new file is the one to use.
4. An important field in the review and compliance database, which is referenced in several other databases (and GIS features are labeled with it) is the *FRNum*. The FR number is derived by concatenating 4 pieces:
    I. the last 2 digits of the year
    II. a year record number (increases sequentially for each new record added in a year)
    III. the primary county abbreviation (2 character)
    IV. an “addinfo” digit which sequentially counts the number of times additional information was added to the record.
5. In the past, if a review and compliance record concerned more than one county the term “MULTI” was used in place of the county segment of the FRNum. This will no longer be done. A primary county will be chosen for the record, with secondary counties listed in a sub-table.
6. The review and compliance data will be split into 2 parts—items that stay the same for each addinfo record (e.g. activity, project name) will be on the “one” side of the relationship. Addinfo records will be in a sub-table, where many can be added. The first time an *FRNum* is used a 0 will be placed in the “addinfo” portion. This will be done to standardize the *FRNum* field.

7. One of the reasons for combining the 4 fields to make the *FRNum* is because that is the number used to map archaeological surveys on USGS topographic maps. SHPO has completed digitizing all of these surveys and wants to link the review and compliance database to the GIS.
8. The *site* field is described as "specific location of project;" SHPO indicates that this field described the vicinity and needs to be 50 characters, instead of the 9.9 listed in the description.
9. *Acreage* field is a text field in the SHPO table. Acreage is usually a number—the field in the new database will be numerical.
10. NRArchit, *FindingArchit, CmtsArchit* fields will be renamed with the Archit in the front. This helps visually group them into a similar subject type. Same for Arch fields.
11. The *Staff&Date* field for both Archit and Arch will be separated into one field for the staff person name and one for the date. Combining different data types in one field results in non-normalized tables.
12. These fields will be renamed as noted in parentheses: *Written* (*DateRequestLetter*), *Received* (*DateReceived*), *Answered* (*DateResponse*), Semi (*DateMonthlyReport*).
13. The requestor address fields will be renamed/re-organized as noted in parentheses: *Addadrs1*(*AddressLine1*), *Addadrs2* (*AddressLine2*), *CityStZip* (separated into 3 fields, *City*, *State*, *Zip*). For the state field can have a drop down with state abbreviations; decision needs to be made if the list will contain all 50 states or just the most common ones.
14. Will link to the GIS database.

II. Archaeological Survey/Bibliography *(Tracks survey reports received by SHPO)*

1. Current SHPO format is one table with 13 fields, 3148 records. Access database table provided with 3 sample records and field descriptions.
2. These reports are only requested (by SHPO reviewing Section 106 project) when a Section 106 Review is being done (T. Koontz). They are filed on the shelves by *FRNum* (filed by county and *FRNum*), however, there could be several phases to this survey so there would be more than one report with the same *FRNum*. Due to the size of some projects, the Phase II and Phase III reports are on shelves in another office. Reports are dated by month and year; date cannot be used as part of a unique identifier.
3. The archaeological sites information is related to the archaeological survey information. Archaeological sites found in an archaeological survey need to be listed with the archaeological bibliography record. If an archaeological site is part of a survey, then the survey number (*FRNum*) needs to be noted in the archaeological sites database.
4. The full *FRNum* from the Review and Compliance database is referenced in the archaeological bibliography; sometimes more than one *FRNum* will be listed with a survey report. SHPO would like this database tied into a GIS system similar to the MAPIT program currently in use.
5. *FRNum* cannot be used as primary key, since more than one *FRNum* can be listed with a survey. There is currently no unique record identifier and an autonumber field will be used for the primary key.

6. *SITE_NO* field description is "Site number of any identified archaeological sites within the project area." In reality, there can be many sites within a project area. This will be a sub-table, where as many sites as needed can be added.
7. Topographic quadrangle, survey authors, archaeological site, and secondary county information are one to many and will be stored in sub-tables were multiple records can be entered.
8. SHPO has requested that the *YEAR* field be formatted as year – three letter month (e.g., 2005-Aug). The description of this field is "Date the report was written"—in some cases just a year is recorded. Because it is not a real date that is being entered, no sorting or mathematical procedures can be done.
9. There are several older reports that have RR (Renegade Reports) for the first 2 digits of the *FRNum*, instead of the 2 digit year. Noted here because this one of the anomalies in the *FRNum*.

III. Archaeological Sites *(A record of all archaeological sites in the state)*

1. Current SHPO table has 143 fields. The ArchSite.dbf file was sent as a sample of this database. "Archaeo Site Form database fields.doc" file was provided with field descriptions. In that document, new fields (not in ArchSite.dbf) were added, raising the number of fields in the table(s) to over 200.
2. This database is a record of all archaeological sites in the state. It contains all information that was available at the time of the survey. Location, description, condition, prehistoric & historic affiliations, time periods, nearest water (minor & major), soil type, etc.
3. The faxed site form is 4 pages long with a continuation sheet. Fields were named with a number on the end – the number corresponds with the question number on the form. SHPO has requested many of the fields be checkboxes so they are easy to use.
4. *SiteNum* is primary key.
5. SHPO has requested the ability of have multiple pairs of UTM coordinates listed; the state archaeologist requests space for 6 UTM coordinate pairs per record. These UTM coordinates won't feed into the GIS, they will come from the submitted reports and will be tested against the actual digitized sites for accuracy. A sub-table can be used to collect multiple UTMs for each unique record.
6. Links to GIS

IV. Architectural Inventory (sites) (*records data about historic architectural sites throughout WV)*

1. Current SHPO format is Lotus Approach, 12,000 records, 50 fields. Excel file with field list and descriptions has been provided (architectural surveydb_description.xls). Later (Feb 2005) another excel file with 81 sample records was provided (architectural_sites.dbf).
2. *SiteNum* is primary key--when a historic architectural site (determined by SHPO) is surveyed it gets a site number. If it is determined significant and listed on the NR then it's assigned an NR RefNum by the NPS. Being an historic architectural site is a prelude

to getting on the NR. However, very few historic architectural sites get placed on the NR.

3. A site can be listed in both the architectural survey database and the national register database.
4. There is a series of fields at the end of the descriptive field list, *SurvName, SurvOrg, SurvDate, Surveyor, SurvName2, SurvOrg2, SurvDate2, Surveyor2*. The 2's are the updated information when a site is resurveyed. A sub-table will be used to capture as many surveys as needed.
5. The *Acreage* and *NumberStories* fields are text fields. SHPO desires these fields to be text instead of numbers because the acreage is an approximation and the number of stories includes the "4 or more" choice. It should be noted that mathematical procedures cannot be performed on text fields, and they will not sort properly (in numerical order).
6. The *NarrativeDescription, AncillaryFeatures, NarrativeHistory, Significance, BiblioRef, and CondAssess* fields have "[attach text file]" after the field name in the database description. According to SHPO these should be memo fields in the database.
7. There is an *FRNum* field in this table which references a single *FRNum* from the review and compliance database.
8. Many dropdown menus requested. SHPO has provided the desired choices for each field. SHPO would like records in this database to have an icon or link to the MAPIT program that would automatically show on the map what you are looking at in the database (T. Koontz, pers comm.).

V. Cemetery *(The WV Cemetery Survey Database records and keeps track of surveyed cemeteries across the state.)*

1. Current SHPO format is one table in Lotus Approach, 772 records, 78 fields. Excel file with field names and descriptions has been provided, plus an Access table with fields and 3 sample records. There are 5 fields in the Access table that are not in the excel file with the descriptions. They are: *MAINTENANC, DECORATIVE, SKETCHES_, BY_FOOT, BY_CAR*. The fields have been reconfigured like this (SHPO): the *maintenance* field is now the *condition* field, the *decorative* field is now broken up into all of the different types of decorations, the *sketches* field needs to be included as a yes/no field, and the *by_foot, by_car* fields have been combined into the *access* dropdown field. T. Koontz has indicated that the excel file is correct with regards to fields.
2. The *CemSiteNumber*field is the same format as the site number used in the archaeological sites database, and, in fact, cemeteries are actually a subset of the archaeological information. Site number is unique and will be used as the primary key.
3. The field named *size* has a description "Size of cemetery given in feet." Upon discussions with SHPO it appears that the cemetery size is not recorded in square feet, and that what is desired is two number fields for length and width of the cemetery in feet. According to SHPO the field labeled as *orientation* has been used to collect the second length dimension (instead of an actual orientation); all of this will be put into 3 fields, one for length in feet, one for width in feet, and an *orientation* field that will contain the direction the cemetery is facing (e.g., N, SW, E, etc.).
4. Many of the fields which should be true numbers (e.g., number of headstones, number of burials, marble GS) have text characters in them. It appears that sometimes a number was used and sometimes a percent. Consistent use of number is preferred for

normalization but SHPO has requested that, because many records have already been entered with percent and approximate values, that the field remain text so the information will not have to be re-entered. SHPO will instruct users to enter only numeric values in the future. Note that mathematical and sorting procedures will not work on number stored in text fields.

5. *AddressLine1, AddressLine2, City, State, Zip*—these fields are the address for the recorder. The *recorder* field will be changed to 2 fields for first and last name. A field for company name (in reference to the recorder) also needs to be added.
6. A field named *RefNum* needs to be added to record the cemetery's National Register number, if applicable.

B. NATIONAL REGISTER AND RELATED DATABASES

VI. National Register Database *(Contains all sites, buildings, and land areas that are registered as historical places)*

1. Will download National Historic Register database from NPS NRIS site (http://www.nr.nps.gov/nrdown1.htm) in dbf format and convert tables to Access format.
2. Using the data dictionary available from NRIS, will create appropriate tables, relationships, and forms for working with West Virginia NR data. The NRIS NR database has records for the entire United States; will reduce to just West Virginia data.
3. SHPO plans to correct mistakes and notify the NPS.
4. SHPO would like the NR information to link to the GIS system, scanned documents, and photos through the NR RefNum.
5. Scanned documents and photos are stored in files and they need to be referenced in the database. These scanned documents and photos are created by SHPO. New NR sites will be scanned as they are listed and input into the database by SHPO.
6. SHPO would like records in this database to have an icon or link to the MAPIT program that would automatically show on the map what you are looking at in the database (T. Koontz, pers comm.)
7. Restricted archeological sites are flagged with a "Y" in the *RESTRICT* field of the propmain table.
8. WVGISTC will need input from SHPO on which NR tables will be utilized.

VII. Grant Database (*Keeps track of all Restoration and Survey & Planning Grants awarded)*

1. Current SHPO table in Lotus Approach format, 25 fields, 831 records. Excel file provided with field names and descriptions. Access table provided with 3 sample data records.
2. Grants awarded must concern sites listed on the National Register before they qualify. Using the NR *RefNum* as the common field, SHPO would like to see any information associated with this grant. This would include information from the NR database, NR photos, tax credits, and a map of where it is located. There are some grants which will not be linked to the NR database (surveys, walking brochures, etc.); if a grant record doesn't have an NR *RefNum* then it is not linked to a record in the NR database.

3. The text field named *fiscal year* has data that has been entered in different formats—data looks like 2002 or FY85. Recommend the field is changed to numerical and years entered in 4 digit (YYYY) format. According to SHPO the Grant coordinator prefers to use the FYxx format.
4. Even though most records in the grants database relate to records in the NR database there is some duplication of fields; for instance, the owner and address fields are repeated in both because owner name and address do not change in the NR database, that's who owned it at the time it was placed on the register. The grant information concerns the current owner.
5. *ContactPerson* field will be replaced with 2 fields, *ContactPersonLastName* and *ContactPersonFirstName*. Separate name fields are preferable for searching and alphabetizing purposes.
6. *GrantNumber* field is unique and will be used as the primary key.

VIII. Tax Database (*Contains data relating to both State and Federal rehabilitation tax credits for historic buildings*)

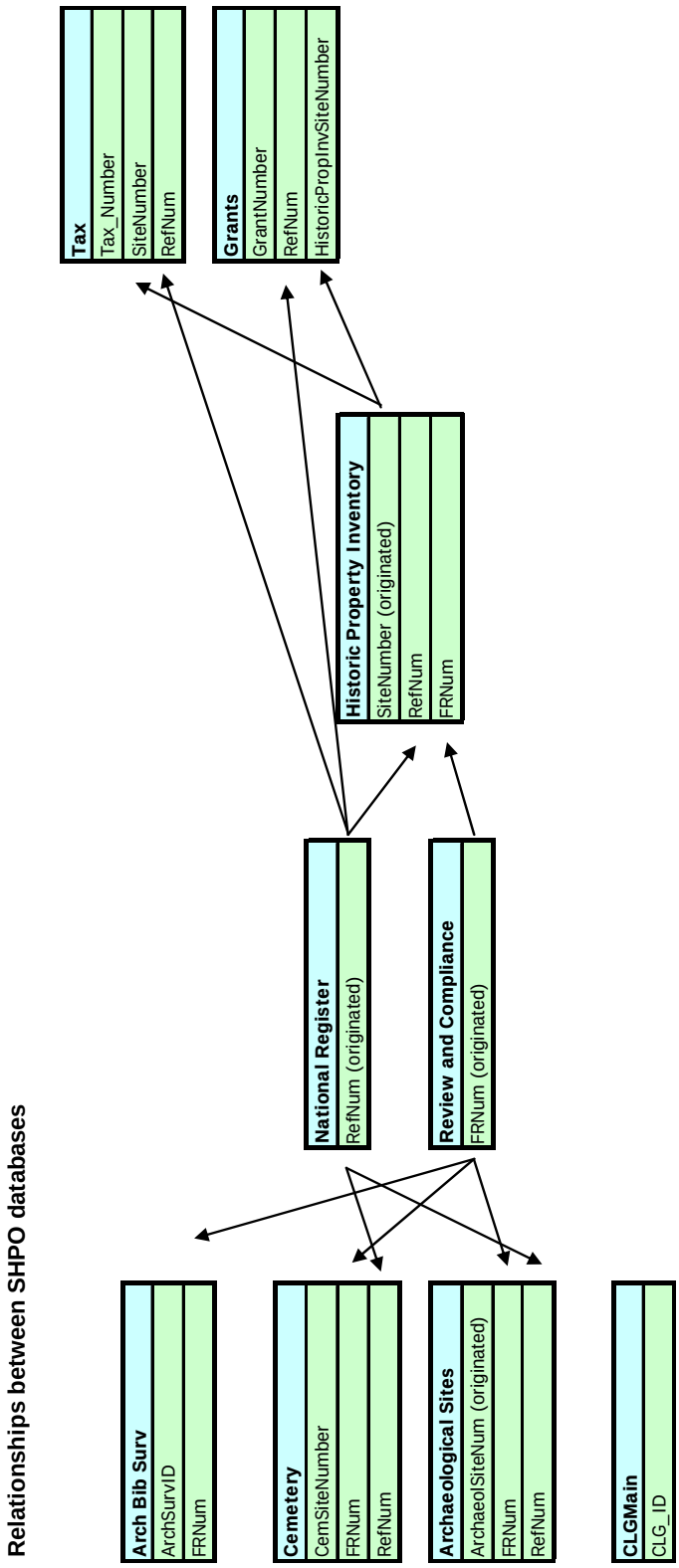
1. Current SHPO data in Lotus Approach format. 298 records. 40 fields. Originally, DBF file provided with 3 sample records. Later (Feb 2005), a Tax database in Access format was sent with some new fields plus field descriptions.
2. To get tax credits a property must be listed on the National Register of Historic Places. There may be some tax records without an NR *RefNum* - some get credits while they are in the process of being listed on the NR. After they are listed the *RefNum* can be input. Some records in the tax database may have no association with the NR database.
3. The *TAX_NUMBER*field is the primary key (unique value) for the tax database.
4. The *owner* field could refer to a person or business. This information and the address information is used to generate letters. It may be advisable to have last name, first name fields, plus an organization field.
5. The table has a field called *PROJECT_COADD* with a description of "Contact person address," then there is a second field of *PROJECT_COTOWN* with a description of "Contact person town." The address field refers to the street address, town is separate for sorting and searching. This same situation goes for the owner fields.
6. The table has fields named *_ADDRECP1* and *_ADDRECP2* that both have the same description: "Date additional information for part 1 application is received." This is another instance of a one-to-many relationship that will be represented by a sub-table, where additional activity on a given record could be listed as many times as necessary.
7. The table has fields named *_SUBMITTED* and *_APPROVED* which refer to Part 1 of the application being submitted.
8. These fields: *PHASED* (y/n field), *CONDITIONS* (y/n field), *AMENDMENT_*, *AMENDMENT1_*, *AMENDMENT2_* have the following descriptions: Phased = Identifies if the project has many parts and will be completed in more than 24 months; Conditions = Restrictions placed upon the applicant that must be completed prior to submission of final approval; Amendment, Amendment1, Amendment 2 = changes to the original description of work as described in Part 2. This can possibly be set up as a one to many sub-table. There can be more than one amendment for each part.

9. *COSTEST* and *COSTACTUAL* fields contain dollar values including cents. The field will be formatted as currency.
10. *USEBEFORE, USEAFTER* fields refer to property use before and after rehabilitation (e.g. offices before, single-family house after).

IX. Certified Local Government (CLG) Database *(Tracks CLG activity throughout the state)*

1. Current SHPO data in Lotus Approach format, 43 records, 24 fields. Excel file with field names and descriptions provided. Access table with sample data provided.
2. Basic info/tracking database for Certified Local Government information. Contains contact information, county, date certified, active status, date annual reports submitted each year.
3. Does not reference any of the other database, nor is it referenced by them.
4. The last and first name fields refer to the name of a contact for the CLG. The contact person changes through the years, these fields track of who currently holds the position.
5. There is a series of fields called: *AR2005, AR2004, AR2003, AR2002, AR2001, AR2000*—each one representing the date each annual report was submitted. Information like that (one-to-many) will be stored in a sub-table. A sub-table will be created where an infinite number of years can be added, with another column for the date of the report.
6. There is currently no unique record identifier and an autonumber field will be used as the primary key.

APPENDIX F: Relationships between SHPO Databases

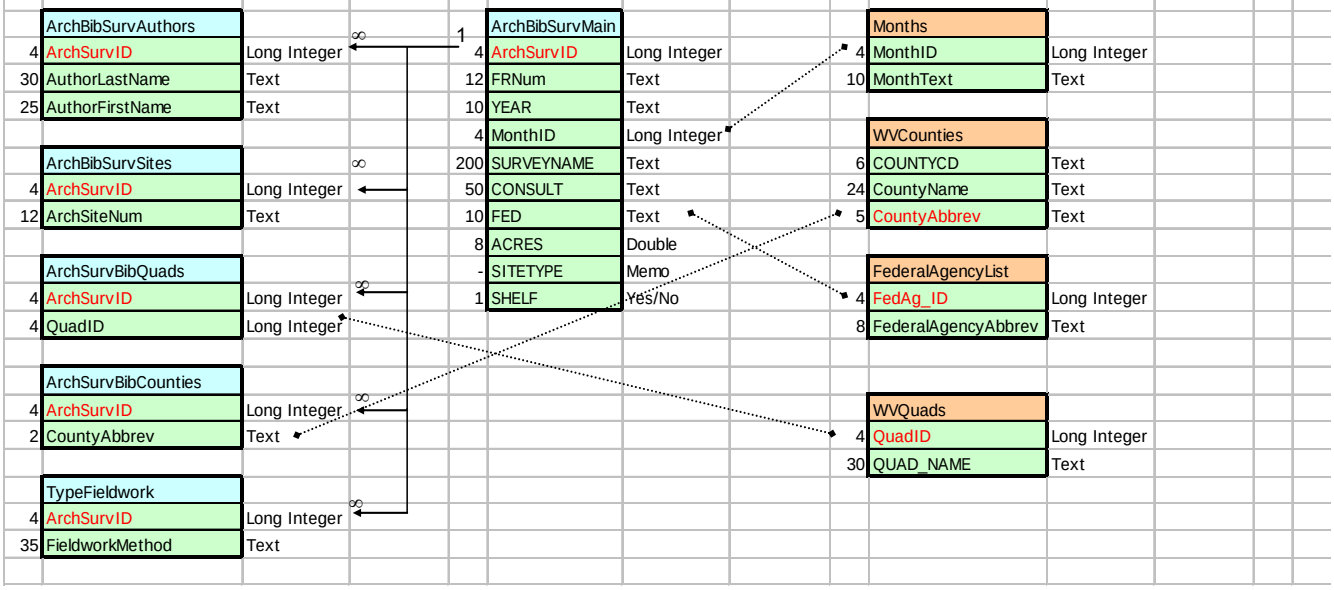


APPENDIX G: Database Schema

Schema: Archaeological Survey/Bibliography

Table names in blue are edited for each Archaeological Survey/Bib record. Table names in orange are support tables that provide drop down values.

Red text indicates table primary key



Schema: Archaeological Sites

Table names in blue are edited for each Archaeological Site record. Table names in orange are support tables that provide drop down values.

Red text indicates table primary key

	ArchaeologicalSitesQuads				ArchaeologicalSitesMain				WVQuads	
4	ArchaeolSiteNum	Long Integer	∞ 1	12	ArchaeolSiteNum	Text		4	QuadID	Long Integer
4	QuadID	Long Integer		10	TYPEFORM	Text		30	QUAD_NAME	Text
				40	SITENAME	Text				
	ArchaeologicalSitesUTM			15	FRNum	Text			WVCounties	
4	ArchaeolSiteNum	Long Integer	∞	2	County	Text		6	COUNTYCD	Text
8	Easting	Double		3	CRMReport	Text		24	CountyName	Text
8	Northing	Double		40	OWNERNAME	Text		5	CountyAbbrev	Text
				40	OWNERSTREETADDRESS	Text				
				20	OWNERCITY	Text				
				2	OWNERSTATE	Text				
				12	OWNERZIPCODE	Text				
				28	TemporalAffiliations	Text				
				1	PrehistTempPeriodUnassigned	Yes/No				
				1	PrehistTempPeriodPaleoIndian	Yes/No			US_States	
				1	PrehistTempPeriodEarlyArchaic	Yes/No		2	StateAbbrev	Text
				1	PrehistTempPeriodMiddleArchaic	Yes/No		40	StateName	Text
				1	PrehistTempPeriodLateArchaic	Yes/No				
				1	PreHistTempPeriodEarlyWoodland	Yes/No				
				1	PreHistTempPeriodMiddleWoodland	Yes/No				
				1	PreHistTempPeriodLateWoodland	Yes/No				
				1	PreHistTempPeriodLate Prehistoric	Yes/No				
				1	PreHistTempPeriodProtohistoric	Yes/No				
				1	HistoricTemporalPeriodUnassigned	Yes/No				
				1	HistoricTemporalPeriod1700-1750	Yes/No				
				1	HistoricTemporalPeriod1751-1800	Yes/No				
				1	HistoricSiteTypeFarmstead	Yes/No				
				1	HistoricSiteTypeCommercial	Yes/No				
				1	HistoricSiteTypeIndustrial	Yes/No				
				10	HistoricSiteTypeIndustrial_kind	Text				
				50	HistoricSiteTypeIndustrial_explain_other	Text				
				1	HistoricSiteTypeMilitary	Yes/No				
				1	HistoricSiteTypeHistoric Earthwork	Yes/No				
				1	HistoricSiteTypeTrailTraceRoad	Yes/No				
				1	HistoricSiteTypeCemetery	Yes/No				
				1	HistoricSiteTypeOther	Yes/No				
				50	HistoricSiteTypeOther_explain	Text				
				3	StandingStructures	Text				
				3	HPIFormCompleted	Text				
				8	SiteDimensions	Double				
				1	SiteAreaUnknown	Yes/No				
				1	SiteBoundariesAreaSurveyed	Yes/No				
				25	SiteAreaBasis	Text				
				50	BasisOtherExplain	Text				

				4	UTMZONE	Long Integer					
				4	NAD	Long Integer					
				8	CenterEASTING	Double					
				8	CenterNORTHING	Double					
				-	LocationDesc	Memo					
				1	TopographicLocationFloodplain	Yes/No					
				1	TopographicLocationTerraceT1	Yes/No					
				1	TopographicLocationTerraceT2	Yes/No					
				1	TopographicLocationTerraceT3	Yes/No					
				1	TopographicLocationRidgeTop	Yes/No					
				1	TopographicLocationRidgeSaddle	Yes/No					
				1	TopographicLocationHillsideBench	Yes/No					
				1	TopographicLocationBluff	Yes/No					
				1	TopographicLocationRockshelterCave	Yes/No					
				1	TopographicLocationOther	Yes/No					
				50	TopographicLocationOther_explain	Text					
				25	PhysiographicProvince	Text					
				50	PhysiographicProvince_other	Text					
				1	CurrentLandUseAgriculturePlowed	Yes/No					
				1	CurrentLandUsePasture	Yes/No					
				1	CurrentLandUseWoodedForested	Yes/No					
				1	CurrentLandUseCemetery	Yes/No					
				1	CurrentLandUseCommercial	Yes/No					
				1	CurrentLandUseIndustrial/Extractive	Yes/No					
				1	CurrentLandUseMilitary	Yes/No					
				1	CurrentLandUseEducational	Yes/No					
				1	CurrentLandUseRecreational	Yes/No					
				1	CurrentLandUseResidential	Yes/No					
				1	CurrentLandUseTransportation	Yes/No					
				1	CurrentLandUseUnknown	Yes/No					
				1	CurrentLandUseOther	Yes/No					
				250	CurrentLandUseOther_explain	Text					
				15	SiteCondition	Text					
				200	DisturbedExplain	Text					
				1	DisturbanceCausePlowed	Yes/No					
				1	DisturbanceCauseErodedEroding	Yes/No					
				1	DisturbanceCauseGradedContoured	Yes/No					
				1	DisturbanceCauseTimbered	Yes/No					
				1	DisturbanceCauseMined	Yes/No					
				1	DisturbanceCauseCollected	Yes/No					
				1	DisturbanceCauseVandalizedLooted	Yes/No					
				1	DisturbanceCauseUnknown	Yes/No					
				1	DisturbanceCauseOther	Yes/No					
				250	DisturbanceCauseOther_explain	Text					
				25	DisturbanceExtent	Text					
				200	SoilAssociation	Text					
				200	SoilSeriesPhaseComplex	Text					
				150	Vegetation	Text					
				25	ELEVATION	Text					
				20	SLOPEPercent	Text					
				15	SLOPEDirection	Text					
				25	NearestWaterSource	Text					
				40	NearestWaterSource_other	Text					
				40	NearestWaterSourceName	Text					
				40	MAJORDRAINAGE	Text					
				40	MINORDRAINAGE	Text					
				25	WATERDistanceHorizontal	Text					
				25	WATERDistanceVertical	Text					
				-	SiteDescription	Memo					
				15	SurfaceVisibility	Text					
				-	SurfaceConditions	Memo					
				1	InvestigationTypeExaminArtifactCollection	Yes/No					
				1	InvestigationTypePedestrianSurvey	Yes/No					
				1	InvestigationTypeSurfaceCollection	Yes/No					
				1	InvestigationTypeSystematic ShovelTestPits	Yes/No					
				1	InvestigationTypeNonSystematicShovelTestPits	Yes/No					
				1	InvestigationTypeTestUnits	Yes/No					
				1	InvestigationTypeDeepTesting	Yes/No					

				50	InvestigationTypeDeepTesting_explain	Text					
				1	InvestigationTypeMechanicalExcavation	Yes/No					
				1	InvestigationTypeMitigationBlocExcavation	Yes/No					
				1	InvestigationTypeAerialPhotograph	Yes/No					
				1	InvestigationTypeRemoteSensing	Yes/No					
				1	InvestigationTypeMetalDetection	Yes/No					
				1	InvestigationTypeUnknown	Yes/No					
				1	InvestigationTypeOther	Yes/No					
				50	InvestigationTypeOther_explain	Text					
				1	SurfaceCollectionStrategyNotApplicable	Yes/No					
				1	SurfaceCollectionStrategyGrabSample	Yes/No					
				1	SurfaceCollectionStrategyDiagnostics	Yes/No					
				1	SurfaceCollectionStrategyControlledTotal	Yes/No					
				1	SurfaceCollectionStrategyControlledSample	Yes/No					
				1	SurfaceCollectionStrategyOther	Yes/No					
				50	SurfaceCollectionStrategyOther_explain	Text					
				3	EXCAVATED	Text					
				200	ExtentNatureExcav	Text					
				255	ARTIFACTSCOLLECTED	Text					
				1	PrehistoricArtifactsLithicDebitage	Yes/No					
				4	PrehistoricArtifactsLithicDebitage_num	Long Integer					
				1	PrehistoricArtifactsOtherLithicTools	Yes/No					
				4	PrehistoricArtifactsOtherLithicTools_num	Long Integer					
				1	PrehistoricArtifactsProjectilePoints	Yes/No					
				4	PrehistoricArtifactsProjectilePoints_num	Long Integer					
				1	PrehistoricArtifactsOtherTools	Yes/No					
				4	PrehistoricArtifactsOtherTools_num	Long Integer					
				1	PrehistoricArtifactsCeramicVessels	Yes/No					
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				1	PrehistoricArtifactsCeramicBodySherds	Yes/No					
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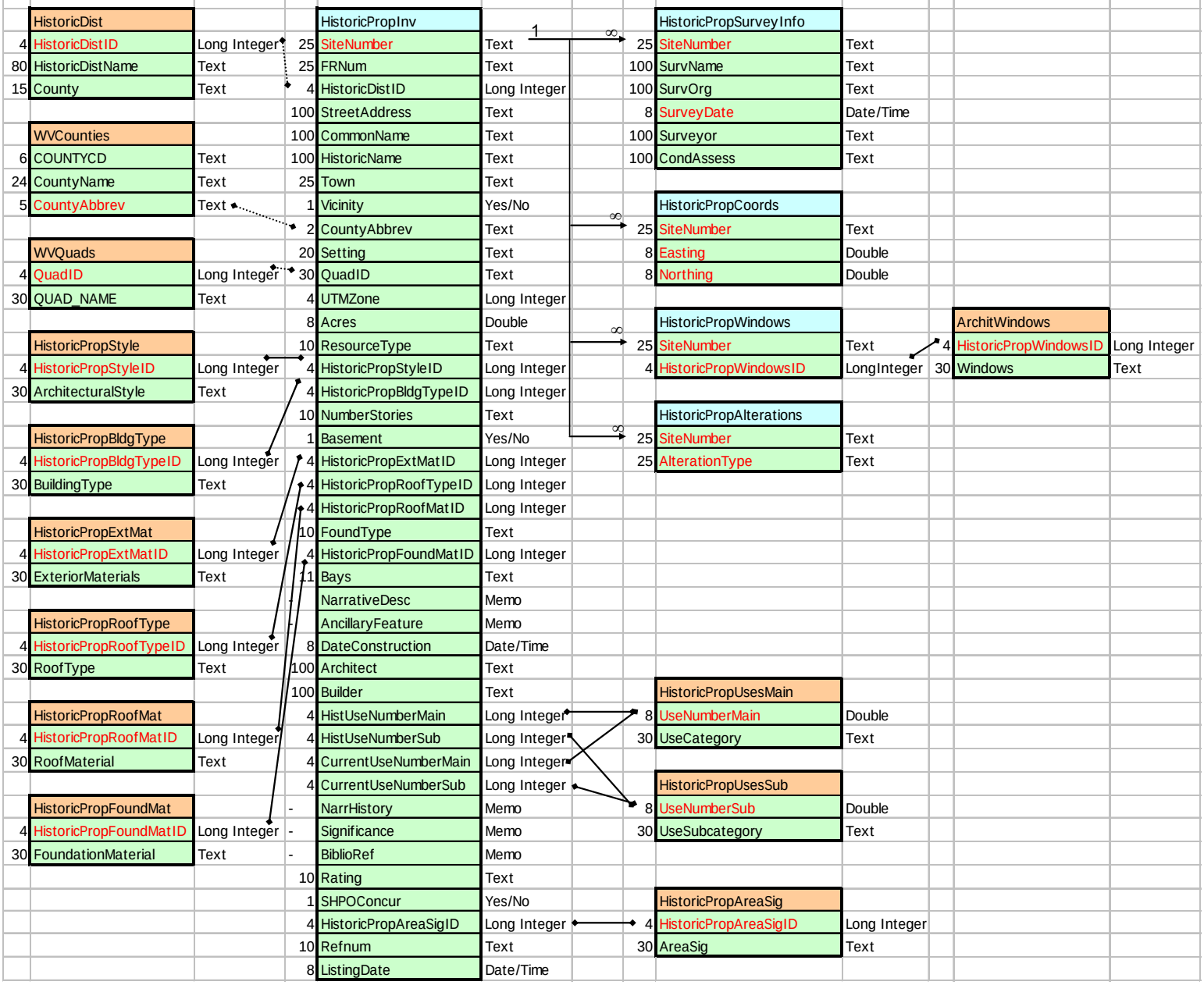
				4	PrehistoricArtifactsFaunalRemains_num	Long Integer					
				1	PrehistoricArtifactsBotanicalRemains	Yes/No					
				4	PrehistoricArtifactsBotanicalRemains_num	Long Integer					
				200	PrehistoricArtifactsOther_describe	Text					
				3	ThermicallyAlteredRock	Text					
				8	ThermicallyAlteredRockWeight	Double					
				8	ThermicallyAlteredRockCount	Double					
				-	PrehistoricAssemblage	Memo					
				1	HistoricArtifactsBrick	Yes/No					
				4	HistoricArtifactsBrick_num	Long Integer					
				1	HistoricArtifactsWindow Glass	Yes/No					
				4	HistoricArtifactsWindow Glass_num	Long Integer					
				1	HistoricArtifactsNails	Yes/No					
				4	HistoricArtifactsNails_num	Long Integer					
				1	HistoricArtifactsHistoricCeramics	Yes/No					
				4	HistoricArtifactsHistoricCeramics_num	Long Integer					
				1	HistoricArtifactsBottleGlass	Yes/No					
				4	HistoricArtifactsBottleGlass_num	Long Integer					

				1	HistoricArtifactsMilitaryItems	Yes/No						
				4	HistoricArtifactsMilitaryItems_num	Long Integer						
				1	HistoricArtifactsClothingRelated	Yes/No						
				4	HistoricArtifactsClothingRelated_num	Long Integer						
				1	HistoricArtifactsFoodRemains	Yes/No						
				4	HistoricArtifactsFoodRemains_num	Long Integer						
				200	HistoricArtifactsOther_desc	Text						
				-	HistoricAssemblages	Memo						
				-	CurationLocation	Memo						
				40	NationalRegisterEligibilityRec	Text						
				-	Eligibility_explain	Memo						
				50	FormPreparedBy	Text						
				150	PreparedByAffiliation	Text				US_States		
				40	PreparedByStreetAddress	Text			2	StateAbbrev	Text	
				20	PreparedByCity	Text			40	StateName	Text	
				2	PreparedByState	Text						
				12	PreparedByZipCode	Text						
				12	PreparedByPhone	Text						
				50	PreparedByEmail	Text						
				8	DateOfFieldwork	Date/Time						
				8	DateFormPrepared	Date/Time						
				-	REFERENCES	Memo						
				50	EligibilityRating	Text						
				12	RefNum	Text						

Schema: Historic Property Inventory

Table names in blue are edited for each Historic Property Inventory record. Table names in orange are support tables that provide drop down values. Red text indicates table primary key.



Schema: Cemetery

Table names in blue are edited for each Cemetery record. Table names in orange are support tables that provide drop down values.

Red text indicates table primary key

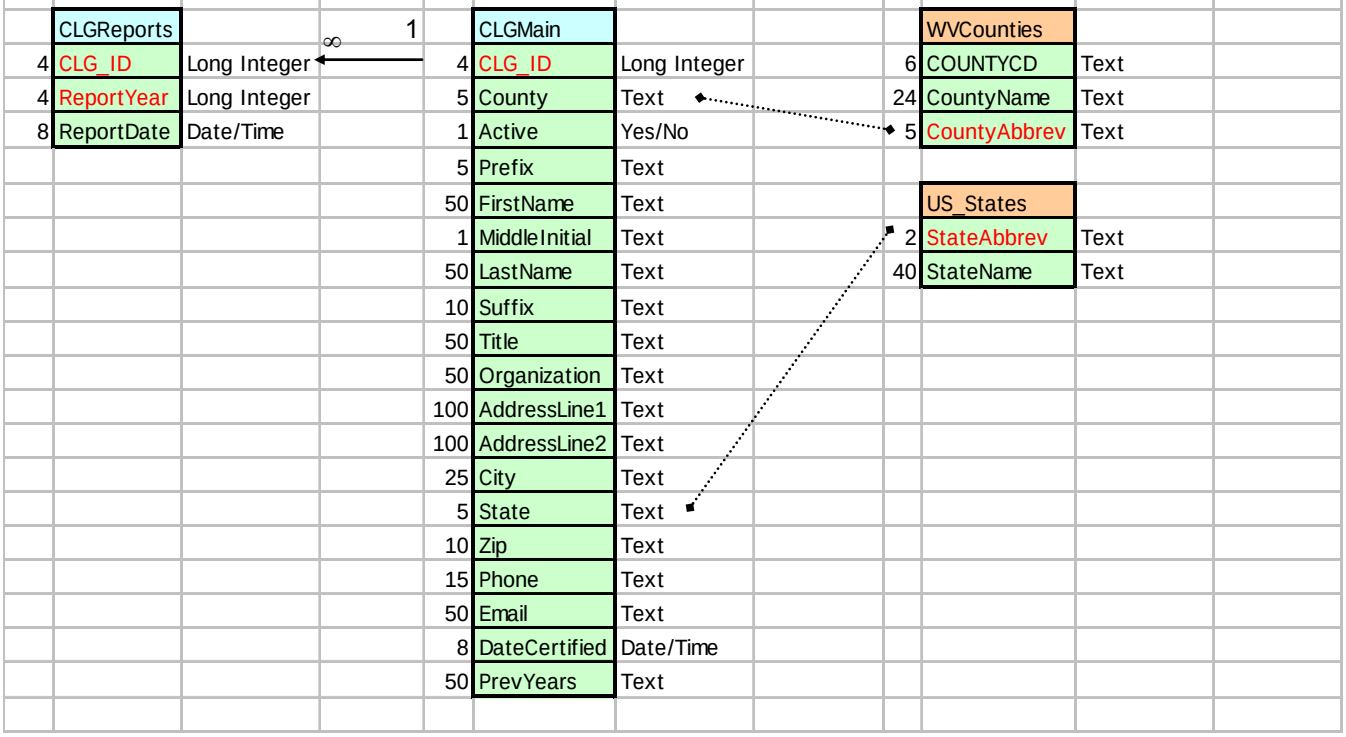
	CemeteryMain		1	∞	CemeteryCounties			WVCounties	
10	CemSiteNumber	Text		10	CemSiteNumber	Text	6	COUNTYCD	Text
2	NR_Rating	Text		2	CountyAbbrev	Text	24	CountyName	Text
40	CommonName	Text					2	CountyAbbrev	Text
40	HistoricName	Text							
12	FRNum	Text			CemeteryQuads			WVQuads	
10	UTMZone	Text	∞	10	CemSiteNumber	Text	4	QuadID	Long Integer
200	Location	Text		4	QuadID	Long Integer	30	QUAD_NAME	Text
10	PublicOwnership	Text							
15	PrivateOwnership	Text			CemeteryCoords				
50	PrivateOwnershipOther	Text	∞		CemSiteNumber				
50	PrivateOwnershipDenom	Text		8	Easting	Double			
100	Population	Text		8	Northing	Double			
100	Surnames	Text							
1	MassGrave	Yes/No							
50	MassGraveExplanation	Text							
12	PublicAccessibility	Text							
50	AccessContact	Text							
5	Access	Text							
50	Terrain	Text							
25	Boundary	Text							
50	BoundaryOther	Text							
25	Condition	Text							
75	ConditionUnidentifiable	Text							
50	Disturbances	Text							
4	Length	Long Integer							
4	Width	Long Integer							
4	Orientation	Text							
50	AssocStructures	Text							
50	AssocLandscape	Text							
-	HistorcalBackground	Memo							
50	NumVisibleHeadstones*	Text							
50	NumBurials	Text							
1	Footstones	Yes/No							
50	18thCentDates	Text							
50	19thCentDates	Text							
50	20thCentDates	Text							
50	21stCentDates	Text							
50	EarliestYear	Text							
50	LatestYear	Text							
50	SlateGS	Text							
50	MarbleGS	Text							
50	GraniteGS	Text							
50	SandstoneGS	Text							
50	FieldstoneGS	Text							
50	OtherGS	Text							

*SHPO has requested that the fields for number of stones be text fields. This will preclude mathematical/sorting functions.

50	OtherGSExplanation	Text											
50	Skulls_DeathsheadsGS	Text											
50	ObeliskGS	Text											
50	CherubGS	Text											
50	Urns_WillowsGS	Text											
50	Lamb	Text											
50	ClaspedHandsGS	Text											
50	AngelsGS	Text											
50	Decorative Carvings Oth	Text											
50	MilitaryGS	Text											
50	MilitaryGSDesc	Text											
50	Mausoleum	Text											
50	MausoleumDesc	Text											
1	OtherStruct	Yes/No											
200	OtherStructDesc	Text											
25	OtherStructArchitSiteNum	Text											
50	ReadableGS	Text											
50	ErodedGS	Text											
50	BadlyTiltedGS	Text											
50	BrokenGS	Text											
50	BrokenStandingGS	Text											
50	BrokenFallenGS	Text											
50	LocationFallen GS	Text											
50	Restoration	Text											
1	Topo Map	Yes/No											
1	Photographs	Yes/No											
1	Sketches	Yes/No											
50	References	Text											
30	RecorderLastName	Text											
20	RecorderFirstName	Text											
50	RecorderCompany	Text											
50	AddressLine1	Text											
50	AddressLine2	Text											
50	City	Text											
50	State	Text											
50	Zip	Text											
8	FormDate	Date/Time											
50	PhoneNumber	Text											
12	RefNum	Text											

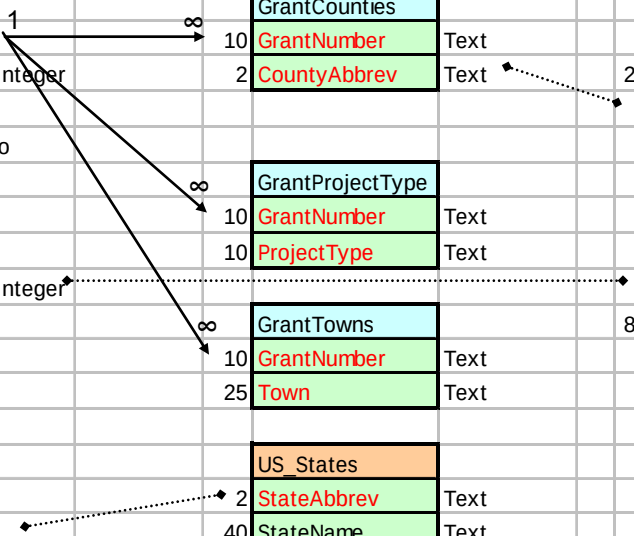
Schema: CLG

Table names in blue are edited for each CLG record. Table names in orange are support tables that provide drop down values. Red text indicates table primary key.



Schema: Grant

Table names in blue are edited for each Grant record. Table names in orange are support tables that provide drop down values. Red text indicates table primary key.



	GrantMain	
10	GrantNumber	Text
4	FiscalYear	Long Integer
8	Fund	Text
1	Statewide	Yes/No
20	NRStatus	Text
50	HistoricName	Text
10	RefNum*	Text
4	HistoricDistID	Long Integer
50	Address	Text
50	Owner	Text
25	OwnerType	Text
40	Project Sponsor	Text
100	ProjectSponsAddress	Text
25	ProjectSponsCity	Text
2	ProjectSponsState	Text
10	ProjectSponsZip	Text
25	SponsorType	Text
8	BeginDate	Date/Time
8	EndDate	Date/Time
8	InitialAmount	Currency
8	AmountIssued	Currency
25	LegalDocument	Text
8	CovExpires	Date/Time
100	ScopeOfWork	Text
45	ContactPersonLastName	Text
25	ContactPersonFirstName	Text
15	ContactPersonPhone	Text
25	SiteNumber	Text
100	Comments	Text

	GrantCounties	
10	GrantNumber	Text
2	CountyAbbrev	Text

	GrantProjectType	
10	GrantNumber	Text
10	ProjectType	Text

	GrantTowns	
10	GrantNumber	Text
25	Town	Text

	US_States	
2	StateAbbrev	Text
40	StateName	Text

	WVCounties	
6	COUNTYCD	Text
24	CountyName	Text
5	CountyAbbrev	Text

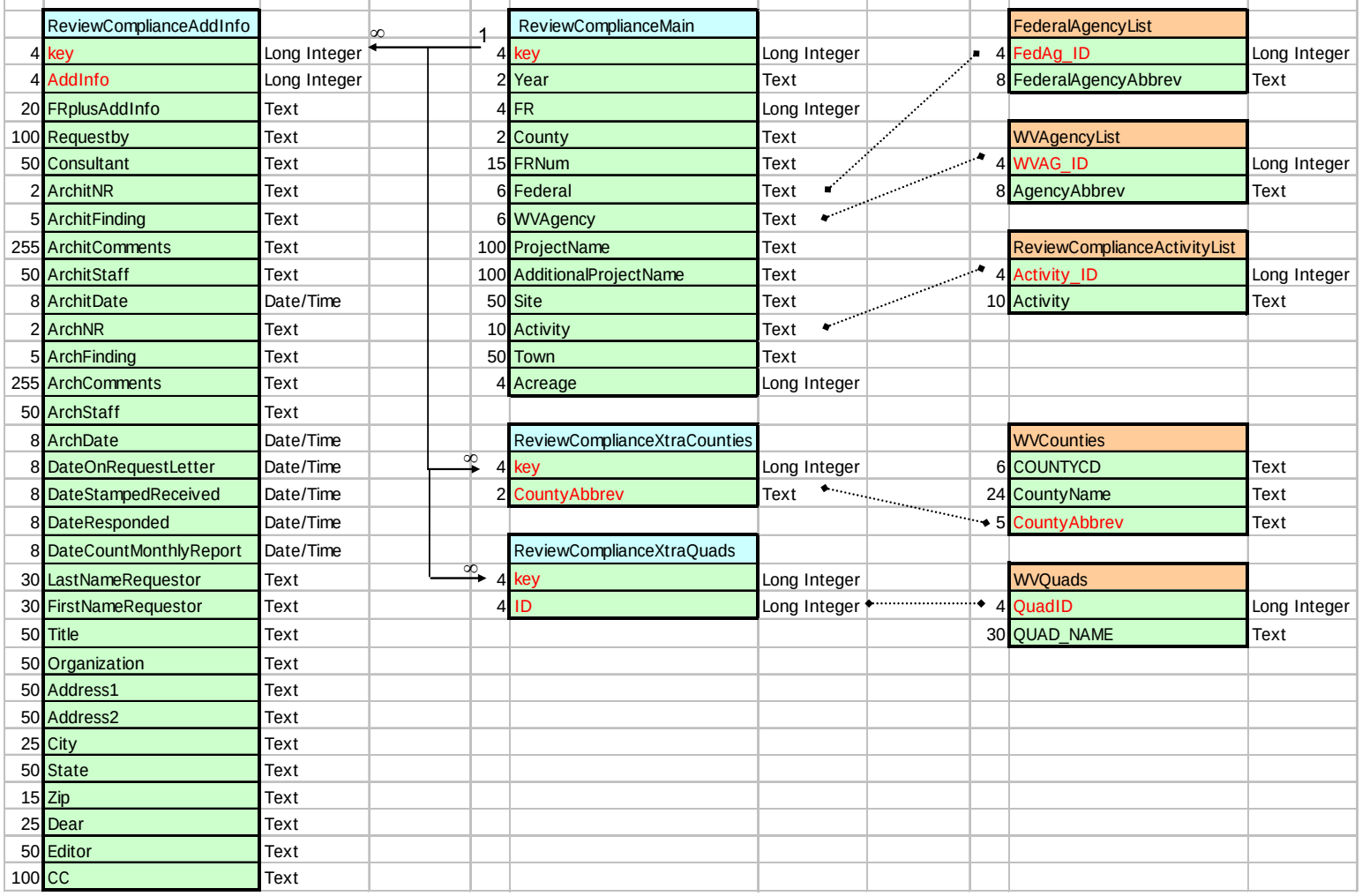
	HistoricDist	
4	HistoricDistID	Long Integer
80	HistoricDistName	Text

* RefNum is a text field because sometimes there are leading zeros and a true number field can't have leading zeros.

Schema: Review and Compliance Database

Table names in blue are edited for each review and compliance record. Table names in orange are support tables that provide drop down values.

Red text indicates table primary key



Schema: Tax

Table names in blue are edited for each Tax record. Table names in orange are support tables that provide drop down values.

Red text indicates table primary key

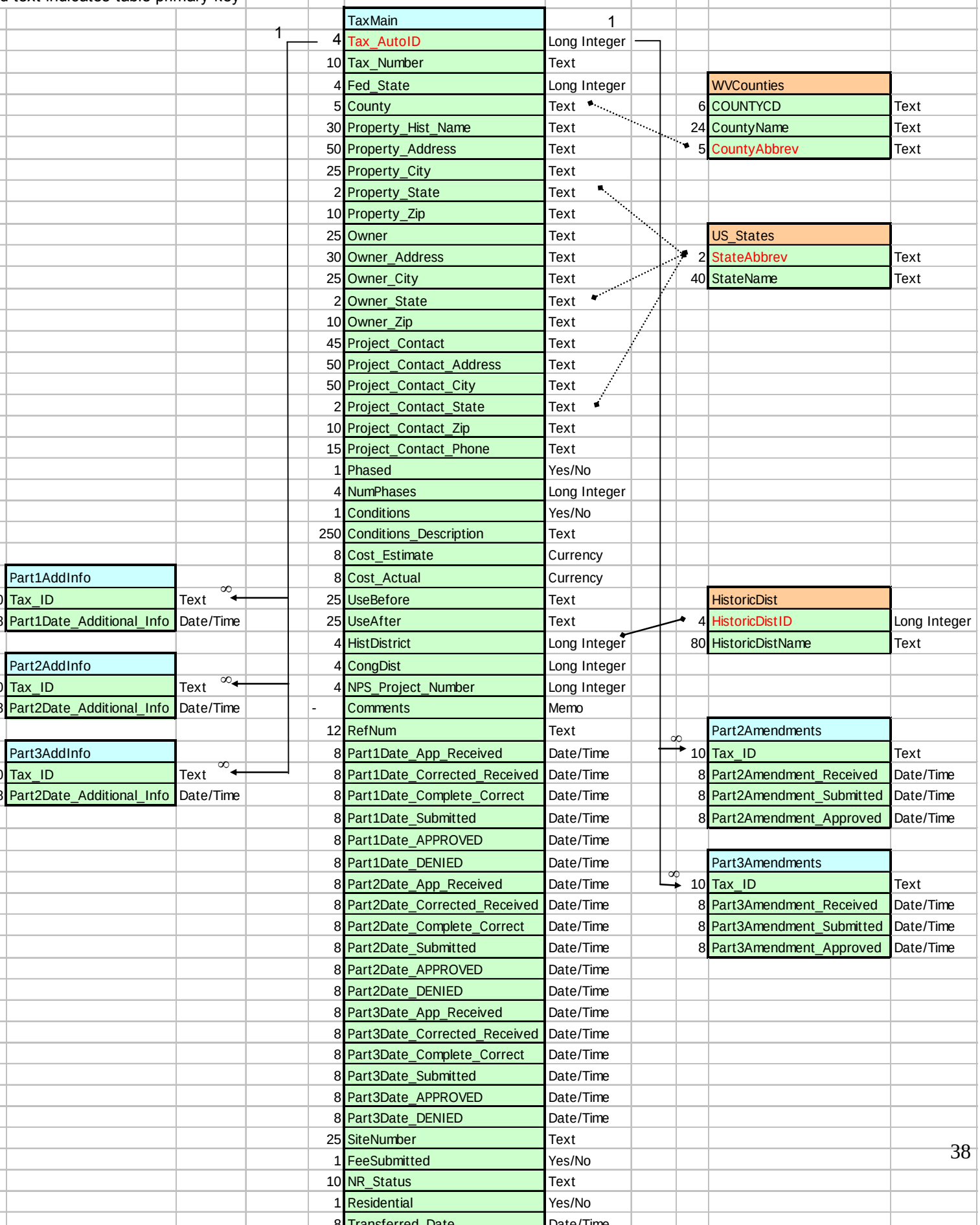


Table Relationship Diagram

West Virginia SHPO National Register Database

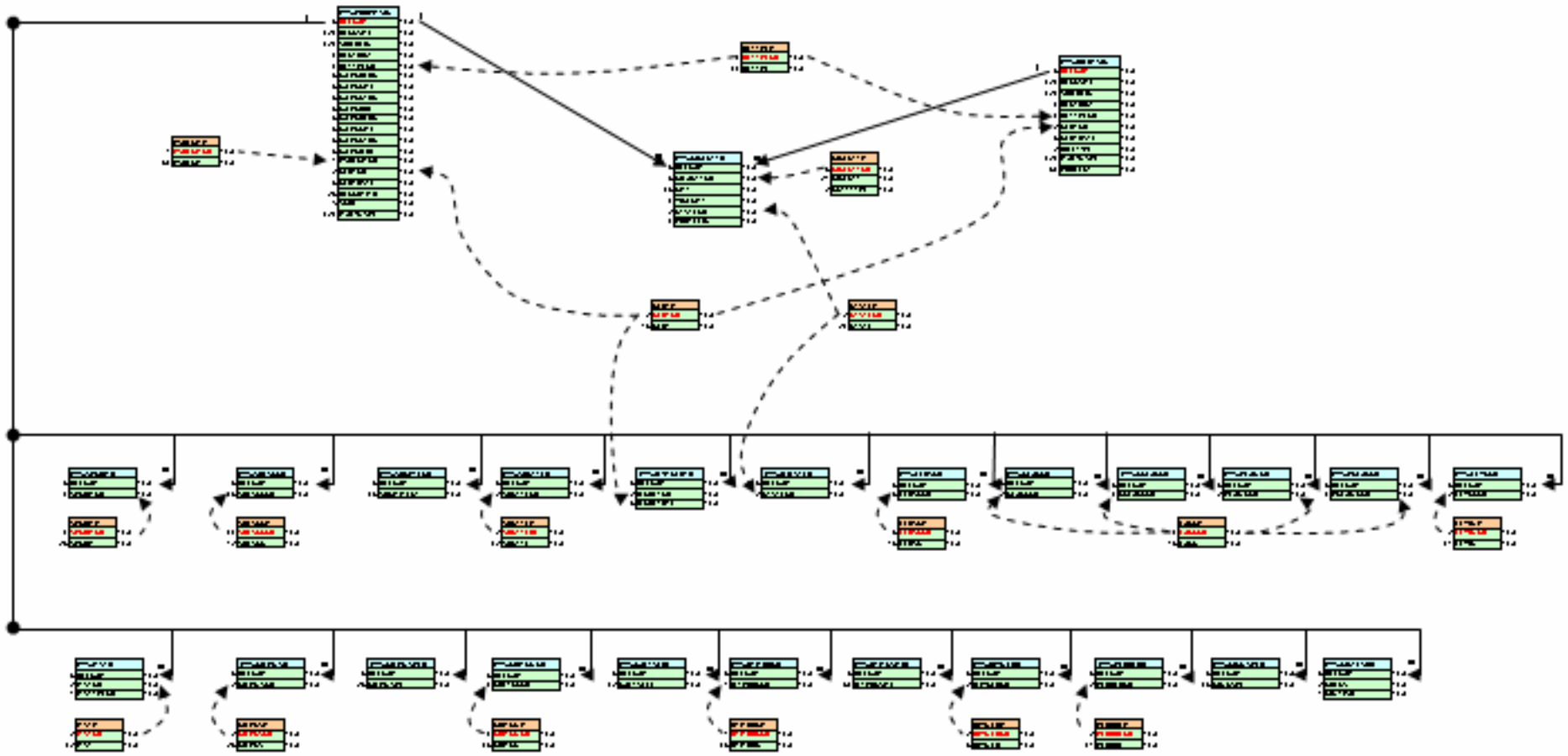


Table names in orange are support tables that provide codes for drop down menus. Table names in blue store the data for each National Register record and are related by the RSF NUM field

The WV_PROPMAIN table contains a single record for each RSF NUM, generally with the basic information such as address and name. Most related tables can contain many records for each RSF NUM.

The WV_DOEMAIN table contains, according to John Byrne, National Register Database Manager, "federally determined eligible properties for which we have very little information by comparison to the properties in WV_PROPMAIN."

APPENDIX H: Database Migration Plans For Archaeological Sites Database.

Map Old Database Fields to New

New Access DB Field Name *Table Name:ArchaeologicalSitesMain*	Old SHPO DB Field Name *From SHPO ArchSite.dbf*	Compatibility of raw data and new structure
ArchaeolSiteNum	SITENO1	! Not unique!!!. The document named Archaeo Site Form database fields.doc indicated that this field would be formatted like 'BB236.' However, all this field has in it is numbers. No county abbreviations.
TYPEFORM	TYPEFORM	A dropdown with 2 choices, 'New Form' and 'Revised Form' was requested. However, 'Cemetery Form' is also a value found in the raw data.
SITENAME	SITENAME2	Ok
FRNum		
CRMReport		
OWNERNAME	OWNER7	All owner info in raw data is in one field. Additional fields for address, city, state, and zip code need to be added and the information moved to the correct field. The new ownername field is only 40 char long (by SHPO request) and there for the current contents of owner7 will not fit in the name field, data will be lost.
OWNERSTREETADDRESS		
OWNERCITY		
OWNERSTATE		
OWNERZIPCODE		
TemporalAffiliations	TAPRE8	Raw data has 'yes' as value or it is blank. SHPO has requested new field be a dropdown with choices 'Prehistoric', 'Historic', 'Prehistoric and Historic.' Field should be updated to those dropdown choices. At the least, need to know which dropdown choice 'yes' will translate to. The word 'yes' will not be permitted in the field, which will be limited to the dropdowns.
PrehistTempPeriodUnassigned	PTPRUN9	Raw data has values of 'yes' and 'no' and blanks. Yesses can be translated into the Access symbol for 'true,' which means a check box shows up as checked. Values of no or blank will appear unchecked.
PrehistTempPeriodPaleoIndian	PTPRPAL9	Values of 'yes' will be shown as checked boxes, any others will be unchecked

PrehistTempPeriodEarlyArchaic	PTPRARC9	Confusion! There is PTPRARC9 for early archaic, which holds values of 'yes' and then there is ARCHEML9 for early middle late archaic which holds values of 'E','M','L.' To complicate things, there seems to be no pattern to when PTPRARC9 has a 'yes' and ARCHEML has a 'E','M',or 'L.' So help is needed on the conversion -- if there is a pattern the three new check boxes can be set up automatically. Otherwise, and perhaps the best solution, would be for SHPO to create the early, middle, late fields and mark which ones are true (checked).
PrehistTempPeriodMiddleArchaic	ARCHEML9 (Early/Middle/Late)	
PrehistTempPeriodLateArchaic		
PreHistTempPeriodEarlyWoodland	PTPRWOOD9	Same problem here as with Archaic. PTPRWOOD9 has 'yes' values in it, whereas WOODEML9 has 'E','M','L' values. Need this to be properly translated to the new 3 fields.
PreHistTempPeriodMiddleWoodland	WOODEML9 (Early/Middle/Late)	
PreHistTempPeriodLateWoodland		
PreHistTempPeriodLate Prehistoric	PTPRLATE9	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PreHistTempPeriodProtohistoric	PTPRPROTO9	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricTemporalPeriodUnassigned	HPTUN_10	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricTemporalPeriod1700-1750	HPT1700_10	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricTemporalPeriod1751-1800	HPT1751_10	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricTemporalPeriod1801-1850	HPT1801_10	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricTemporalPeriod1851-1900	HPT1851_10	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricTemporalPeriod1901-1950	HPT1901_10	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricTemporalPeriod1951-Present	HPT1951_10	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricSiteTypeLithicScatter	PSTLITH11	Values of 'yes' will be shown as checked boxes, any others will be unchecked. Note, other values such as 'vil' or 'cam' were observed in this field. Will be lost if not changed to 'yes.'
PrehistoricSiteTypeLithicHabitation		
PrehistoricSiteTypeQuarry	PSTEXTQ11	Values of 'yes' will be shown as checked boxes, any others will be unchecked. Note, other values such as 'ear' or 'bur' were observed in this field. Will be lost if not changed to 'yes.'

PrehistoricSiteTypeProcurementWorkshop	PSTEXTWS11	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricSiteTypeEarthworkMound	PSTEXTEW11	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricSiteTypeBurialArea	PSTEXTBA11	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricSiteTypePetroglyphPictograph	PSTEXTPP11	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricSiteTypeUnknown		
HistoricSiteTypeResidential	HSTRES12	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricSiteTypeFarmstead	HSTFARM12	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricSiteTypeCommercial	HSTCOM12	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricSiteTypeIndustrial	HSTIND12	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricSiteTypeIndustrial_kind		
HistoricSiteTypeIndustrial_explain_other		
HistoricSiteTypeMilitary	HSTMIL12	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricSiteTypeHistoric Earthwork		
HistoricSiteTypeTrailTraceRoad	HSTTTR12	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricSiteTypeCemetery		
HistoricSiteTypeOther	HSTOTH12	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricSiteTypeOther_explain		
StandingStructures	STANDSTRUCT12	(actually, the ArchaeologySitedb_descript_comparison.xls document prepared by SHPO indicated that STANDSTRUCT12 but itappears in raw data that the field is called STANDSTRUC?) Appears ok, with 'yes' and 'no' values as desired for the dropdown.
HPIFormCompleted	STRUCTINVENT12	(actually, the ArchaeologySitedb_descript_comparison.xls document prepared by SHPO indicated that STRUCTINVENT12 but itappears in raw data that the field is called STRUCTINVE?) Appears ok, with 'yes' and 'no' values as desired for the dropdown.
SiteDimensions_Length	SITEAREA24	Right now all dimension info is in one field. SHPO request was for "Site Area (Dimension in Meters)"--however the SITEAREA24 field in the raw data has many types of values, everything from circumference to volume, compass directions, text notes etc. Ideally for dimensions it would be best to have a length x width in separate numerical fields, and of the same units. Need to know if want it left as single text field.

SiteDimensions_Width		
SiteAreaUnknown		
SiteBoundariesAreaSurveyed		
SiteAreaBasis	BASIS24	Ok
BasisOtherExplain	OTHER24	Ok
UTMZONE	UTMZONE5	Ok. Zeros will be dropped, 17, 18's kept.
NAD		
CenterEASTING	EASTING5	Ok. Zeros will be dropped. Leading zeros dropped.
CenterNORTHING	NORTHING5	Ok. Zeros will be dropped. Leading zeros dropped.
LocationDesc	LOCATION6	Ok. Memo Field.
TopographicLocationFloodplain	TOPOLOC15	Is currently a text field in raw data, desired to be a bunch of checkboxes. Can programatically mark the appropriate check box based on the contents of text field. However, at least one value in the text box does not match the desired check boxes--Gap/Saddle. Also, it appears that terrace used to be handled in 2 fields, text box value Terrace, and then the TERRACE15 field with a number in it. Can programatically mark the new T1, T2, T3 checkboxes based on the TERRACE15 field--however, it appears that when terrace is used in the TOPOLOC15 field, there is not always a valuein the TERRACE15 field, hence there may be loss of information. Please update TERRACE15 field to appropriately reflect its relationship with TOPOLOC15.
TopographicLocationTerraceT1	TERRACE15 (1/2/3)	See note above, with TOPOLOC15.
TopographicLocationTerraceT2		
TopographicLocationTerraceT3		
TopographicLocationRidgeTop		
TopographicLocationRidgeSaddle		
TopographicLocationHillsideBench		
TopographicLocationBluff		
TopographicLocationRockshelterCave		
TopographicLocationOther	OTHER15	If there is text in the raw data field, the check box will be checked. Actual text will be moved to the _explain field.
TopographicLocationOther_explain		
PhysiographicProvince	PHYSIOPROV16	Ok.
PhysiographicProvince_other	PPOTHER16	Ok.
CurrentLandUseAgriculturePlowed	LANDUSE14	Currently raw landuse data all in one text field. SHPO has requested individual check boxes for each land use type. Could be done programatically if the raw data values matched the drop down choices--but in many cases it does not. Raw data does not have dropdown values. Please change values to match dropdown choices. Then checkboxes can be

		marked programatically.
CurrentLandUsePasture		
CurrentLandUseWoodedForested		
CurrentLandUseCemetery		
CurrentLandUseCommercial		
CurrentLandUseIndustrial/Extractive		
CurrentLandUseMilitary		
CurrentLandUseEducational		
CurrentLandUseRecreational		
CurrentLandUseResidential		
CurrentLandUseTransportation		
CurrentLandUseUnknown		
CurrentLandUseOther		
CurrentLandUseOther_explain		
SiteCondition	SITECOND13	Ok. Values match dropdown choices provided by SHPO.
DisturbedExplain	DISTBEXP13	Ok. Although I am not sure why there is a field request for explaining the disturbance, and then a set of checkboxes to check off for the disturbance type? Right now these disturbance checkboxes will have no data, since there is no corresponding field in the raw data.
DisturbanceCausePlowed		
DisturbanceCauseErodedEroding		
DisturbanceCauseGradedContoured		
DisturbanceCauseTimbered		
DisturbanceCauseMined		
DisturbanceCauseCollected		
DisturbanceCauseVandalizedLooted		
DisturbanceCauseUnknown		
DisturbanceCauseOther		
DisturbanceCauseOther_explain		
DisturbanceExtent		
SoilAssociation	Soils7	Ok. Free text.
SoilSeriesPhaseComplex	SOILPHASE17	Ok. Free text.
Vegetation	VEGETATION18	Ok. Free text.
ELEVATION	ELEVATION19	Ok. Free text. Ideally this would be a number field for proper sorting, grouping, etc. However, has text characters in it.
SLOPEPercent	SLOPE_20	Ok. Free text. Another field that would ideally be a number field.

SLOPEDirection	SLOPEDIR21	Ok. Free text. Be sure that entries have 20 char or less, since that is requested field size.
NearestWaterSource	WATERTYPE22	Ok. Values in field appear to match desired drop downs.
NearestWaterSource_other	WATEROTHER22	Ok. Free text. Be sure that entries have 40 characters or less, since that is the requested field size. Appears some are longer.
NearestWaterSourceName	NEARWATER22	Ok. Free text. Be sure that entries have 40 characters or less, since that is the requested field size. Appears some are longer.
MAJORDRAINAGE	MAJDRAIN22	Ok. Free text. Be sure that entries have 40 characters or less, since that is the requested field size. Appears some are longer.
MINORDRAINAGE	MINORDRAIN22	Ok. Free text. Be sure that entries have 40 characters or less, since that is the requested field size. Appears some are longer.
WATERDistanceHorizontal	WATERHORZ23	Ideally this would be a number field. Units not standardized (feet, meters, yards, km all used). As of now is a text field, make sure less than 10 characters, as that was requested field size.
WATERDistanceVertical	WATERVERT23	Ideally this would be a number field. Units not standardized (mostly feet, ranges, not single number). As of now is a text field, make sure less than 10 characters, as that was requested field size.
SiteDescription	DESC25	Ok. Free text. Large memo field.
SurfaceVisibility	SV28	The only value in this field is "unrecorded," which does not match the drop down choices provided. Either add this as a drop down choice, or remove from field.
SurfaceConditions	SURCOND28	Ok. Free text. Large memo field. Appears to be mostly unused.
InvestigationTypeExaminArtifactCollection	ITEC26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypePedestrianSurvey	ITPS26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeSurfaceCollection	ITSC26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeSystematic ShovelTestPits	ITST26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeNonSystematicShovelTestPits		
InvestigationTypeTestUnits	ITTU26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeDeepTesting	ITDT26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeDeepTesting_explain		
InvestigationTypeMechanicalExcavation	ITASC26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeMitigationBlocExcavation	ITMBE26	Values of 'yes' will be shown as checked boxes, any others will be unchecked

InvestigationTypeAerialPhotograph	ITAP26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeRemoteSensing	ITRS26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeMetalDetection		
InvestigationTypeUnknown	ITUNK26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeOther	ITOT26	Values of 'yes' will be shown as checked boxes, any others will be unchecked
InvestigationTypeOther_explain		
SurfaceCollectionStrategyNotApplicable	SCSNA27	Values of 'yes' will be shown as checked boxes, any others will be unchecked
SurfaceCollectionStrategyGrabSample	SCSGS27	Values of 'yes' will be shown as checked boxes, any others will be unchecked
SurfaceCollectionStrategyDiagnostics	SCSDIAG27	Values of 'yes' will be shown as checked boxes, any others will be unchecked
SurfaceCollectionStrategyControlledTotal	SCSCT27	Values of 'yes' will be shown as checked boxes, any others will be unchecked
SurfaceCollectionStrategyControlledSample	SCSCS27	Values of 'yes' will be shown as checked boxes, any others will be unchecked
SurfaceCollectionStrategyOther	OTHER27	Appears unused. Will be a check box. Separate field collects explanation of other.
SurfaceCollectionStrategyOther_explain		
EXCAVATED	EXCAVATED29	Ok. Dropdown values of yes and no represented.
ExtentNatureExcav	PERCENTEX29	Ok. Free text. Appears to be a little used field.
ARTIFACTSCOLLECTED	ARTCOLLECT30	Has values like some, none, all, occaisionally a number. Ok if left as free text. Although the description of the field seems to indicate it would be better as a pure number field.
PrehistoricArtifactsLithicDebitage	PACLITHDEB30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricArtifactsLithicDebitage_num		
PrehistoricArtifactsOtherLithicTools	PACLITHTOOL30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricArtifactsOtherLithicTools_num		
PrehistoricArtifactsProjectilePoints	PACLITHPP30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricArtifactsProjectilePoints_num		
PrehistoricArtifactsOtherTools		
PrehistoricArtifactsOtherTools_num		
PrehistoricArtifactsCeramicVessels		
PrehistoricArtifactsCeramicVessels_num		
PrehistoricArtifactsCeramicRimSherds	PACCERRS30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricArtifactsCeramicRimSherds_num		
PrehistoricArtifactsCeramicBodySherds	PACCERBS30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricArtifactsCeramicBodySherds_num		

PrehistoricArtifactsFaunalRemains	PACCERFM30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricArtifactsFaunalRemains_num		
PrehistoricArtifactsBotanicalRemains	PACCERBM30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
PrehistoricArtifactsBotanicalRemains_num		
PrehistoricArtifactsOther_describe	PACOTHERDES30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
ThermicallyAlteredRock		
ThermicallyAlteredRockWeight		
ThermicallyAlteredRockCount		
PrehistoricAssemblage		
HistoricArtifactsBrick	HACARCHBRICK30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsBrick_num		
HistoricArtifactsWindow Glass	HACARCHWG30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsWindow Glass_num		
HistoricArtifactsNails	HACARCHNAIL30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsNails_num		
HistoricArtifactsHistoricCeramics	HACCERM30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsHistoricCeramics_num		
HistoricArtifactsBottleGlass	HACBGLASS30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsBottleGlass_num		
HistoricArtifactsMilitaryItems	HACMIL30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsMilitaryItems_num		
HistoricArtifactsClothingRelated	HACPERS30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsClothingRelated_num		
HistoricArtifactsFoodRemains	HACFOOD30	Values of 'yes' will be shown as checked boxes, any others will be unchecked
HistoricArtifactsFoodRemains_num		
HistoricArtifactsOther_desc	HACARCHOTHER30	Right now this field only has "yes" or "no" in it. From the database fields document it appears that it should be a memo field?
HistoricAssemblages	DESC30	Ok, free text memo field.
CurationLocation	CURLOC31	Ok, free text memo field.
NationalRegisterEligibilityRec	NRHP32	Please standardize the values to the desired drop down choices (4 were provided).
Eligibility_explain	EXPLAIN32	Ok, free text memo field.
FormPreparedBy	FORMBY33	Appears ok--make sure text entries are 50 or less char, as that was the space alotted.
PreparedByAffiliation	AFFILIATION34	Appears ok--make sure text entries are 150 or less char, as that was the space alotted.

PreparedByStreetAddress	ADD35	Needs to be split up--street address stays in this field, new fields for city, state, zip
PreparedByCity		
PreparedByState		
PreparedByZipCode		
PreparedByPhone	PHONE36	Format phone numbers consistently. Currently, new database is set up to accept format ###-###-####.
PreparedByEmail	EMAIL37	Appears unused. Size limit of 50 as requested.
DateOfFieldwork	DATEWORK38	Field is set up to accept dates in the format dd/mm/yyyy as requested. However, dates in existing field are not consistent with this format. Change them to be consistent, otherwise will have to change the field to free text, allowing any entry.
DateFormPrepared	DATEFORM39	Values appear to be correctly formatted as dd/mm/yyyy. Ok.
REFERENCES	REFERENCE40	Ok, free text memo field.
EligibilityRating		
RefNum	REFNUM32	Appears only used once. There is room for 10 digit refnum.

Table Name:ArchaeologicalSitesCounties

ArchaeolSiteNum		Will be the foreign key linking to table ArchaeologicalSitesMain
CountyAbbrev	COUNTY3	Majority are 2 char county abbrev. Anything else will be lost. Appears to be one to one now?

Table Name:ArchaeologicalSitesQuads

ArchaeolSiteNum		Will be the foreign key linking to table ArchaeologicalSitesMain
QuadID	QUAD7_4	Only proper WV quad names should be in this field, appears to be other information in the field not appropriate.

Table Name:ArchaeologicalSitesUTM

ArchaeolSiteNum		Will be the foreign key linking to table ArchaeologicalSitesMain
Easting		
Northing		

APPENDIX I: WVbasemap Data Layers

POINT THEMATIC FEATURES (Cities, Structures, etc.)

- Major City — Census_2500_ppl.sde
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=173
- Populated Place — GNIS_ppl
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=19
- Hospital — hospitals_DHHR
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=176
- Grade School — schools_k-12
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=180
- University / College — schools_colleges
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=24
- Church (GNIS) — GNIS_churches
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=12
- Cemetey (GNIS) — GNIS_cemeteries
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=14
- Airport — airports_NTAD
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=115

TRANSPORTATION

- Interstate — roads_interstate.sde
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=107
- US Highway — roads_UShighway
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=106
- State Highway — roads_statehighway
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=106
- Major Connector or Street — roads_major_roads
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=238
- Local Road — roads_local
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=238
- Scenic Byway — roads_byway
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=111
- Trail — trails_100k
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=84
- Railroad — railroads_NTAD
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=113

HYDROGRAPHY

- 100k Major Stream (line) — hydro_100k_major_rivers.sde
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=204
- 100k Major Waterbody (polygon) — hydro_100k_major_lakes
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=204
- 24k NHD River/Stream (line) — hydro_24kNHD_streams
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=235
- 24k NHD Waterbody (polygon) — hydro_24kNHD_waterbodies
  http://wvgis.wvu.edu/data/dataset.php?action=search&ID=235

BOUNDARIES

POLIITICAL BOUNDARIES

- State Boundary (1:24k) — bdry_state24k.sde

http://wvgis.wvu.edu/data/dataset.php?action=search&ID=115
- County Boundary (1:24k) bdry_county24k
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=136
- Incorporated Place census_incorp_100k_poly
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=8

PUBLIC LAND BONDARIES
- National Forest (Surface Ownership) bdry_nationalforest_s.sde
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=259
- National Park (Proclamation Boundary) bdry_nationalpark_p
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=57
- National Wildlife Refuge bdry_nwr
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=236
- State Forest bdry_stateforest
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=58
- State Park bdry_statepark
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=203
- State Wildlife Management Area (minus WMAs on USFS Lands) bdry_wma_no_USFS
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=59

TAX DISTRICT BOUNDARIES
- Tax District bdry_tax_districts
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=3

HISTORICAL
- National Register of Historic Places (points) NR_points
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=20
- National Register of Historic Places (polygons) NR_polygons
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=20

ELEVATION
- 30-Meter NED NED_30m.sde
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=29

BASE IMAGERY
- NED Shaded Relief*
http://ned.usgs.gov/
- SAMB Orthophotos
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=254 SAMB_orthos_2003_2ft
- SPOT Imagery
http://wvgis.wvu.edu/data/dataset.php?action=search&ID=90 SPOT_imagery2000_10m
- TerraServer DOQ*
http://terraserver.microsoft.com/
- TerraServer DRG*
http://terraserver.microsoft.com/

* Data served from remote Web mapping service

APPENDIX J: GIS Database Evaluation Report

March 11, 2005

Tami Koontz
WV State Historic Preservation Office
Division of Culture and History
1900 Kanawha Blvd. East
Charleston, WV 25305-0300

RE: Evaluation of SHPO's GIS Files

Dear Tami,

We evaluated the SHPO GIS files you dropped off at our last meeting in Morgantown. It appears that most of the GIS files are in the Geographic Coordinate System, NAD27 Datum. Some of the GIS files were not viewable or contained incorrect coordinates. Certain records had no identifiers, which are essential to link tabular and spatial data together. See Table 1.

We will need to devise a business plan to ensure the SHPO GIS files are properly formatted for linking to the databases. This will require close coordination, training, and quality control measures on both our parts. We will also have to generate reconciliation reports to make sure all unique identifiers match properly between the spatial and tabular records.

Below are some parameters that should be adopted for the GIS files to link successfully to the tabular databases:

Statewide Files: All countywide files are appended into a single statewide file.

Feature Types: Each data theme is comprised of only two feature types: points and polygons. Line features should be converted to polygons.

Unique Identifier: All features have a standardized, unique identifier.

Database Schema: Select database fields are identical in name, width, and data type.

Overlapping Features: Overlapping and single polygons are represented in the same layer.

Polygon Topology: Polygon features have topology to correctly depict geographic relationships between neighboring features.

Coordinate System: All features have the same projection and datum. The coordinate system should be either UTM or geographic, and the horizontal datum NAD83.

I look forward to continuing a mutually beneficial partnership with your agency. Please contact me if you have any questions about this report.

Sincerely,

Kurt Donaldson

Mr. Kurt Donaldson
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cc: Ms. Nicole Edwards

Table 1. Evaluation of SHPO GIS Layers

Data Theme	Feature Type	Status	# Files	# Records	Sample IDs
Architectural	Points	*Corrupt Data:* • Cabell • Greenbrier • Putnam • all *Incorrect Coordinates:* • Berkeley • Hancock • Jefferson	59	36767	HK-1636 HK-1639-0011 OH-0001-4087A TA-0022 TA-0015-0006
	Lines	*okay*	3	3	
	Polygons	*Projection Definition:* • Grant	25	206	
	Overlapping Polygons	?	?	?	
Archeological Sites	Points	*Incorrect Coordinates:* • Jefferson	56	7478	WZ46 WD907 RD6 PU76A No # Site/Surv
	Lines	*okay*	7	9	
	Polygons	*Corrupt Data:* • Calhoun	55	1517	
	Overlapping Polygons	*okay*	11	22	
Archeological Surveys	Points	*okay*	47	2379	95-519-BY 00-7-WD 00-1069-PH 98-5-PD 95-781-MULTI 95-1077-MULTI RR-2-OH 95-838-MO/Wrong
	Lines	*okay*	53	575	
	Polygons	*okay*	58	1334	
	Overlapping Polygons	*okay*	27	92	
National Register	Points	*?*	1	661	75001883 79002582 66000036 98001466 90001054
	Lines	*?*	0	0	
	Polygons	*?*	1	195	