WORKPLAN

GIS DATABASE FOR FIBER NETWORK, DEPARMENT OF TECHNOLOGY, CITY OF COLUMBUS OHIO

T&M ASSOCIATES

WORK PLAN

FOR THE

GIS DATABASE FOR FIBER NETWORK,

DEPARMENT OF TECHNOLOGY,

CITY OF COLUMBUS OHIO

PROJECT TEAM

Project Manager	Erick Lobao.	Ext. 9233
QA Lead	Darlene M. Scott.	Ext. 9234
QA Support	Larry Rover.	(855) 469-4828
Database Design Lead	Tom Tri	Ext. 3663
Senior GIS Analyst	Bill Foster	Ext. 9229
Jr. GIS Analyst	Jon Wyome	Ext. 9255
Jr. GIS Analyst	Michael Opritza	Ext. 9244

PROJECT CONTACTS

Gary Cavin
Director and CIO
City of Columbus,
Department of Technology
1111 East Broad Street
Columbus, OH 43215
614-645-2550

Shoreh Elhami, GISP
Citywide GIS Manager
City of Columbus,
Department of Technology
1111 East Broad Street
Columbus, OH 43215
(614) 645-2109

PROJECT OVERVIEW

The City of Columbus maintains a Fiber Optic communications network. Previous attempts at developing a GIS for this network dataset have been made. This project will start by examining existing data sources to determine what, if any of the existing geodatabase schema and features can be re-used. Performing a detailed review of the existing data sources will be an important component of this project as this process due to the amount of existing information that needs to be organized and because this process will directly inform the geodatabase design and implementation phase of the project.

PROJECT GOAL STATEMENT

Develop a detailed geodatabase and organize corresponding source documents for the City's Fiber Infrastructure Network using Schneider Electric ArcFM Fiber manager and conduit manager. At the end of the project the City will have a fully populated geodatabase and will be fully self-sufficient when performing future updates and regular maintenance of fiber infrastructure GIS features.

BUDGET OVERVIEW

Work on this contract will be performed for the following costs:

$ 18,754	Review the existing geodatabase, software, and supporting datasets and evaluate their accuracy and completeness.
$139,598	Database Schema Design & Implementation
$ 18,168	Final Deliverables and Documentation
$176,520	**Total Cost**

SCOPE OF SERVICES

Task 1: Review the Existing Geodatabase, Software, and Supporting Datasets and Evaluate Their Accuracy and Completeness

Geodatabase: T&M will perform a detailed review of the existing geodatabase to determine which components of the database schema can be transferred to the new geodatabase. T&M staffs' direct experience managing the first data conversion effort using the ESRI data model will make this process smooth and efficient. Geometric network traces will be performed to identify connectivity problems. Manual and automated techniques will be also be used to provide a detail review of the existing attributes. Additionally, Senior GIS Analysts will examine the spatial location of fiber network features (cables, fiber structures, splice points, poles, etc.) by visually comparing their location with other City provided GIS layers such as orthophotography and utility basemap features (poles, manholes, underground vaults, etc.). Performing automated, manual, and visual inspection of the existing geodatabase will provide a clear understanding of which parts of the existing database can be transferred.

Software: T&M will work closely with DoT staff to ensure that application and database configuration between the production environment at T&M matches the production environment at DoT. This will allow for a smooth transition of data deliverables throughout the project.

Supporting Datasets: T&M's project staff will perform a detailed and thorough review of all existing supporting datasets described in the RFP. In order to develop a Fiber network Geodatabase that is accurate and reliable it is important to develop a detailed understanding of the volume and quality of the existing source materials. Additionally T&M will work closely with DoT staff to prioritize the data sets based on their overall quality. For example, if paper drawings are found to be more accurate and up-to-date compared to an AutoCAD drawing, then

the paper drawing will be used as the primary source for data conversion and QA/QC. This process will also help T&M develop a set of file organization and naming standards to ease the transition of project work to DoT staff.

T&M will scan existing paper as built drawings in order to georeference these drawings as needed. This will enhance the existing data sets and provide the City with digital copies of existing paper drawings.

Task 1 Deliverables:

- **Quality Assessment Report:** The primary deliverable associated with Task 1 will be a detailed Quality Assessment Report that contains all findings made during the geodatabase, software, and supporting asset review. This QA report is significant as the findings contained in the document will inform the subsequent tasks defined in this project plan.

- **Quality Assessment Review Meeting:** After DoT reviews the QA report, T&M will meet with DoT project team to review and discuss key items from the report. Discussing the QA findings early on in the project will help inform the subsequent tasks performed during the next task (Task 2) and will reduce the need for additional schema changes in the future.

- **System Architecture Meeting:** A system architecture meeting will be held to develop a set of procedures to allow for future patches and service packs for ArcFM. This will be applied to both the production installations at T&M and the City as these updates are released by Schneider Electric during the project. This meeting could be held in conjunction with the QA review meeting.

Task 2: Propose and Implement a New Geodatabase Schema and Content

Based on the evaluation and the information derived from the QA Report, T&M will propose an optimum schema for the geodatabase and the most preferred methodology to assemble and incorporate the supporting datasets (detailed methodology for each component) into the system. T&M has developed two sub tasks for this task:

Task 2.1 Develop Schema & Conversion Procedures

The following are components of the implementation plan delivered as part of Task 2:

Full Geodatabase Schema Design: The starting point for this task will be the Quality Assessment Report developed during Task 1. T&M will work closely with the DoT project team to review the findings of the Quality Assessment Report to develop a customized ArcFM Fiber data model that meets the needs of DoT. A customized Universal Markup Language (UML) diagram will serve as the primary document in which database customizations will be tracked and documented.

Data Conversion: Building off the QA report, T&M and the City will prioritize data sources and develop and overall strategy for incorporating the existing data sources. This overall strategy will be expanded into an implementation plan that contains a set of data conversion procedures which T&M staff will follow to implement the ArcFM geodatabase and fully populate the ArcFM features.

Data conversion procedures will cover the following areas:

- Strategies to incorporate the existing data sources into the new geodatabase.
- Detailed information on conversion and integration of each data source shall be fully described:
    - Basic ArcFM configuration of favorite object types (symbology, default attribution, etc.).
    - Process for loading fibers into conduits using conduit manager.

    - General digitizing procedures (order of feature generation, topology, and order of attribution).
    - File naming conventions for existing data sources.
- Procedures for documenting and tracking questions or anomalies in the source data back and forth with DoT.

Task 2.2 Populate Database

T&M will utilize the two ArcFM licenses and the Conduit Manager license provided by the City to fully populate the ArcFM database. T&M will deploy an ArcSDE database to store the custom ArcFM database and allow for versioned editing. A QA version will be established allowing QA Lead and QA support staff to review feature classes and attributes while GIS Analysts are creating features. The QA version will also undergo additional checks prior to delivery of interim deliverables to DOT.

Supporting documents reviewed and utilized during the data conversion will be organized according to the data conversion procedures as an ongoing part of the data conversion process. For example, if an existing file name must be modified for a CAD drawing which is used to populate the ArcFM geodatabase in order to meet the agreed upon naming convention it will happen as the GIS analyst examines the data source and prepares it for integration.

All staff performing edits to the database will follow the detailed data conversion procedures for feature creation and attribution. On a project of this size and complexity there are likely to be conflicts between existing data sources. T&M will keep track of any conflicts or by using a comment tracking feature class which will show the location of the issue and provide a brief explanation of the problem. This feature class will be transferred to DOT staff for review as part of the interim deliverable process. Additionally, T&M will keep track of general questions / comments about the data sources and or project details using an issue tracking spreadsheet. This spreadsheet will provide a simple and effective way to track when and how comments are captured and addressed

Interim Deliverable Summary: T&M anticipates providing three interim ArcFM geodatabase deliverables during Task 2. T&M will work with DOT to prioritize areas for deliverables and will make an effort to include completed circuits as part of each interim deliverable. Interim deliverable will consist of the following items:

- ArcFM object type file geodatabase
- ESRI object type file geodatbase
- ArcFM object type schema & database export (.XML)
- ESRI object type schema & database export (.XML)
- Issue tracking spreadsheet (.xlsx)

Task 2 Deliverables:

- Large format UML diagram suitable for printing**.**
- Empty ESRI & ArcFM .XML schema.
- Empty ESRI and ArcFM object file Geodatabase.

Three Interim Deliverables:

  - ArcFM Object Type File Geodatabase
  - ESRI Object Type File Geodatbase
  - ArcFM Object Type Schema & Database export (.XML)
  - ESRI Object Type Schema & Database export (.XML)
  - Issue Tracking Spreadsheet (.xlsx)
- All supporting documents placed in organized folders.
- Data conversion procedures document.
- Devise Naming Convention Standards for all file types (photos, AutoCAD, PDF, Visio files).
- Future data maintenance procedures document (Internal to DoT).
- On-site data maintenance training.

Task 3 Deliverables & Documentation

Based on the information in Tasks 1 and 2 T&M will be required to deliver the following products:

- Quality Assessment (QA) Report.
- A large format UML diagram suitable for printing.
- Empty ESRI and ArcFM object file Geodatbase .XML schema.
- Empty ESRI and ArcFM object file Geodatabase.
- Data conversion procedures.
- Fully populated Geodatabase containing the entire Fiber Network; the Geodatabase will incorporate AutoCAD drawings, content of the multi-worksheet Excel file, PDF files, hard copy contents, Visio drawings, and link to photos.
- All supporting documents placed in organized folders.
- Devise Naming Convention Standards for all file types (photos, AutoCAD, PDF, Visio files).
- Data Maintenance Procedure document (for Geodatabase and supporting datasets).
- On-site data maintenance training.
- Gantt chart identifying key dates and milestones.
- Provide FGDC metadata at the feature class level.

QA/QC STATEMENT

Ongoing QA/QC checks will be performed by GIS Analysts and Senior Analysts as part of their regular data conversion activities. Weekly QA/QC will be performed by the QA Lead and QA Support staff. Additional QA / QC will be performed on each interim deliverable prior to submission to DoT for review. Detailed QA/QC procedures are available in the QA/QC Plan.

DELIVERABLES

Required project deliverables include:

- Quality Assessment (QA) Report.
- A large format UML diagram suitable for printing.
- Empty ESRI and ArcFM object file Geodatbase .XML schema.
- Empty ESRI and ArcFM object file Geodatabase.
- Data conversion procedures.
- Fully populated Geodatabase containing the entire Fiber Network; the Geodatabase will incorporate AutoCAD drawings, content of the multi-worksheet Excel file, PDF files, hard copy contents, Visio drawings, and link to photos.
- All supporting documents placed in organized folders.
- Devise Naming Convention Standards for all file types (photos, AutoCAD, PDF, Visio files).
- Data Maintenance Procedure document (for Geodatabase and supporting datasets).
- On-site data maintenance training.
- Gantt chart identifying key dates and milestones. (Attached to Example Project Plan)

INTERIM DELIVERABLES & PROJECT MILESTONES

T&M will provide interim geodatabases to show progress and to get DoT comments and feedback. Each deliverable will include:

- ArcFM object type file geodatabase
- ESRI object type file geodatbase
- ArcFM object type schema & database export (.XML)
- ESRI object type schema & database export (.XML)
- Issue tracking spreadsheet (.xlsx)

DoT will have one week to review interim deliverables and provide feedback to T&M. T&M will incorporate comments and feedback in conjunction with regular data conversion activities.

INVOICE REQUIREMENTS

This project will be billed at four (4) milestones based on milestone deliverables. A proposed billing schedule is included below.

Invoice Milestone	Date
Task 1: Review existing geodatabase, software, and supporting data sets	**Thu 2/13/14**
Deliver Final QA report (Invoice Milestone #1)	Thu 2/13/14
Task 2: Propose and Implement new geodatabase schema and content	**Tue 6/24/14**
Deliver Final Database Schema (Invoice Milestone #2).	Mon 3/10/14
Task 2.2: Populate Database	**Tue 6/24/14**
Submit Interim Deliverable #2 (Invoice Milestone #3)	Mon 4/28/14
Task 3: Prepare Final Deliverables	**Fri 7/11/14**
Submit FINAL Deliverable (Invoice Milestone #4)	Fri 7/11/14

SCHEDULE

A detailed schedule is provided. T&M will have the final deliverables on July 11, 2014. Revisions to schedule must be approved by DoT and Project Manager.

Task Name	Duration	Start	Finish
Notice of Award	0 days	Fri 11/1/13	Fri 11/1/13
Task 1: Review existing GeoDatabase, software, and supporting data sets	**28 days**	**Mon 1/6/14**	**Thu 2/13/14**
Kick off Meeting (Project Commencement)	1 day	Mon 1/6/14	Mon 1/6/14
GeoDatabase review	9 days	Tue 1/7/14	Fri 1/17/14
Supporting data-set review	17 days	Tue 1/7/14	Thu 1/30/14
Software review	11 days	Tue 1/7/14	Wed 1/22/14
Develop QA Report	1 day	Fri 1/31/14	Fri 1/31/14
Deliver DRAFT QA Report	0 days	Fri 1/31/14	Fri 1/31/14
*DoT Review: QA Report	5 days	Mon 2/3/14	Fri 2/7/14
Quality Assessment and system architecture review meeting	1 day	Mon 2/10/14	Mon 2/10/14
T&M revisions to QA report	3 days	Tue 2/11/14	Thu 2/13/14
Deliver Final QA report (Invoice Milestone #1)	0 days	Thu 2/13/14	Thu 2/13/14
Task 2: Propose and implement new geodatabase schema and content	**91 days**	**Fri 2/14/14**	**Tue 6/24/14**
Task 2.1 Develop schema & conversion procedures (Implementation Plan)	**16 days**	**Fri 2/14/14**	**Mon 3/10/14**
Modify schema & develop conversion procedures	10 days	Fri 2/14/14	Fri 2/28/14
Deliver DRAFT database schema	0 days	Fri 2/28/14	Fri 2/28/14
*DoT Review: Database Schema	5 days	Mon 3/3/14	Fri 3/7/14
Schema and conversion procedure review meeting	1 day	Mon 3/10/14	Mon 3/10/14
Deliver Final Database Schema (Invoice Milestone #2)	0 days	Mon 3/10/14	Mon 3/10/14
Task 2.2: Populate Database	**75 days**	**Tue 3/11/14**	**Tue 6/24/14**
Populate database for Deliverable #1	15 days	Tue 3/11/14	Mon 3/31/14
Internal QA Deliverable #1	2 days	Fri 3/28/14	Mon 3/31/14
Submit Interim Deliverable #1	0 days	Mon 3/31/14	Mon 3/31/14
*DoT Review: Deliverable #1	5 days	Tue 4/1/14	Mon 4/7/14
Populate database for Deliverable #2	20 days	Tue 4/1/14	Mon 4/28/14
Internal QA Deliverable #2	2 days	Fri 4/25/14	Mon 4/28/14
Submit Interim Deliverable #2 (Invoice Milestone #3)	0 days	Mon 4/28/14	Mon 4/28/14

Task Name	Duration	Start	Finish
*DoT Review: Deliverable #2	5 days	Tue 4/29/14	Mon 5/5/14
*First DoT Field Review	15 days	Tue 4/29/14	Mon 5/19/14
Populate database for Deliverable #3	25 days	Tue 4/29/14	Tue 6/3/14
Internal QA Deliverable #3	2 days	Mon 6/2/14	Tue 6/3/14
Submit Interim Deliverable #3	0 days	Tue 6/3/14	Tue 6/3/14
*DoT Review: Deliverable #3	5 days	Wed 6/4/14	Tue 6/10/14
*Second DoT Field Data Review	15 days	Wed 6/4/14	Tue 6/24/14
Task 3: Prepare Final Deliverables	**22 days**	**Wed 6/11/14**	**Fri 7/11/14**
Address outstanding comments from previous reviews	10 days	Wed 6/11/14	Tue 6/24/14
Internal QA Final Deliverable	2 days	Mon 6/23/14	Tue 6/24/14
Submit DRAFT Cumulative Deliverable	0 days	Tue 6/24/14	Tue 6/24/14
*DoT Review: DRAFT Cumulative Deliverable	5 days	Wed 6/25/14	Tue 7/1/14
Incorporate FINAL comments	5 days	Wed 7/2/14	Wed 7/9/14
Submit FINAL Deliverable (Invoice Milestone #4)	2 days	Thu 7/10/14	Fri 7/11/14