

Attachment to the Proposal Instructions

Scope of Work, Qualifications, and Bid Format

(see Proposal Instructions, section 1, for further information)

Contract# 01P068 Project Name: MetroGIS' Internet-Enabled Data Distribution Mechanism

I. Project Objectives

The project period is November 1, 2001 through August 30, 2002. The purpose of this project is to design and implement an Internet-based, data delivery mechanism that satisfies the following objectives:

1. Automates processes involved in distributing geospatial data via the internet to the MetroGIS data user community, including a security module that provides the ability to distinguish between data requests that require licensing and/or fees and data requests that require neither.
2. Provides the user with the ability to obtain data (source geospatial data and/or image map services) for self-defined geographic areas of interest within the seven-county area and the ability to self-select among available data themes for the area of interest.
3. Provides users with multiple geospatial data format choices, wherever possible and practical.
4. Identifies consistencies and inconsistencies with the Open Geographic Consortium's proposed Internet Map Services standard and proposed MetroGIS project funded as an NDSI Grant testbed.
5. Works with systems supported by the Metropolitan Council. (*Note: software other than currently supported by the Council is permissible provided it works with existing systems.*)

II. Project Direction

Throughout the duration of the project, the Contractor will work under the general direction of the MetroGIS Staff Coordinator, who will serve as Project Manager. The Project Manager will oversee interaction between the Contractor and the MetroGIS Project Management Team. This Team will be comprised of the leadership of the MetroGIS Coordinating Committee; Policy and Technical Advisory Teams; the MetroGIS Staff Coordinator, other project staff and participants of MetroGIS, as determined by MetroGIS.

The Contractor will be responsible for timely coordination and communication with staff and all MetroGIS groups identified by the MetroGIS Project Management Team, and for timely delivery of all deliverables.

The Contractor will be expected to effectively communicate its proposals to the MetroGIS' staff, and teams and facilitate discussion, as necessary, to clarify any desired modifications to the proposed design and arrive at solutions acceptable to all parties.

The Proposer shall include the following Milestones in the proposal, outlining the dates and who would attend from the consultant team: *(Note, these milestones must be incorporated into the Proposer's detailed timeline; they are not intended to stand alone):*

1) Design Clarification Meeting

Meeting with MetroGIS' Project Management Team immediately following project initiation to firm up the design concept, clarify understanding of expectations, and finalize the project timeline. (Assume a full day for this meeting). The Contractor shall have responsibility for documenting the conclusions reached at the meeting in the form of a "Functional Requirements Document." (See Section VII 2). This document should provide a full listing of all the functional requirements for the creation and implementation of the data distribution project. The project time line may assume the Contractor has up to ten (10) working days following the meeting to submit, in MS Word document format via email, the Functional Requirements Document to the MetroGIS Project Manager. The MetroGIS Project Manager will forward the document to the Project Management Team to review and provide written feedback to the Contractor within ten (10) working days as to whether the contents of this document accurately reflect the requirements of the project. The Contractor shall have five (5) working days to submit the final Functional Requirements Document to the Project Manager, by MS Word document via email. *(Note to the Proposer, assuming the contract is executed in accordance with preliminary timeline, this milestone should be completed by December 14, 2001.)*

2) Design Specification Agreement Meeting

Meeting with MetroGIS' Project Management Team to discuss the Contractor's proposed design specifications. The Contractor shall submit a "System Design Document" (Section VII, 3), in MS Word document format via email, to the MetroGIS Project Manager not less than five (5) working days prior the meeting. *(Note to the Proposer, MetroGIS assumes this meeting will occur not later than the first week in February 2002.)* The System Design Document shall provide detailed information about how the functional requirements will be implemented. It must also include diagram(s) showing the procedural flow of the solution and graphics showing prototype interfaces. The objective of this meeting is to provide feedback to the Contractor and reach agreement on design specifications. (The Proposer should assume a full day for purposes of this meeting). The Contractor shall have responsibility for updating the System Design Document in accordance with the conclusions reached at this meeting and for describing any outstanding concerns that remain to be addressed by the Contractor. The project time line must assume the Project Management Team has ten (10) working days following the meeting to submit comments to the Contractor as to whether the contents of this document accurately reflect the requirements of the project. The Contractor shall have five (5) working days to submit the final System Design Document to the Project Manager, by MS Word document via email. *(Note to he Proposer, MetroGIS assumes this milestone will be completed by March 1, 2002.)*

3) Preliminary Design Feedback Forum

MetroGIS will organize a MetroGIS community review for the purpose of providing user feedback and comments on a fully operational but preliminary version of the proposed data delivery mechanism, including but not limited to, web interface, data distribution capabilities, and access security procedures. This activity shall consist of the following components:

- a) The Contractor shall provide the Project Manager with the Internet address (URL) to the operational alpha version of the proposed data delivery mechanism. MetroGIS' assumption is that the preliminary version of the proposed mechanism will be housed on a web site hosted by the Contractor. (MetroGIS assumes delivery of the URL will occur not later than March 29, 2002.)
- b) The project time line shall provide the MetroGIS Project Management Team with fifteen (15) working days to test the alpha version of the proposed data delivery mechanism. MetroGIS assumes its staff will have the opportunity to discuss questions and concerns with the Contractor on a regular basis during testing of the alpha version. The MetroGIS Project Management Team must submit its written comments (assumes within scope of project) regarding any unresolved concerns to the Contractor by April 26, 2002. The Contractor shall have up to ten (10) working days to modify the mechanism, creating the beta version. (MetroGIS assumes the beta version will be available for review not later than May 10, 2002.)
- c) MetroGIS will invite a representative cross-section of the MetroGIS community to visit the beta version of the Internet site and evaluate its functionality and user friendliness. Evaluators will be given ten (10) working days to evaluate the preliminary design.
- d) MetroGIS will host a Preliminary Design Evaluation Forum, not later than the first week in June 2002, at which the evaluators will be encouraged to collectively agree on desired additions and modifications to the preliminary design. The Contractor **will not** be present at this Forum to encourage open dialogue by the evaluators.
- e) The MetroGIS Project Management Team will summarize direction received from the MetroGIS community at the Preliminary Design Evaluation Forum and submit its written comments to the Contractor within ten (10) working days of the Forum. The MetroGIS Project Management Team shall decide, depending upon the substance of the comments received at the Preliminary Design Evaluation Forum, whether a meeting is necessary with the Contractor to effectively communicate direction received from the Forum participants. The Proposer shall include as an optional expense, a full day meeting in the event MetroGIS believes a meeting is necessary. If MetroGIS deems a meeting is necessary, the Proposer shall assume it would occur within fifteen (15) working days of the Forum. The Contractor shall have up to ten (10) working days to modify the mechanism, creating the preliminary final version, unless otherwise agreed upon by the parties. MetroGIS assumes this milestone can be completed by July 12, 2002.

4) **Install Deliverable & Documentation**

The Contractor shall make arrangements through the MetroGIS Project Manager to install, on the Metropolitan Council's system, and test the fully operational preliminary final version of the deliverable (modified to incorporate the modifications agreed upon in Milestone 3), demonstrate the required support requirements to appropriate support staff, and transfer associated operations knowledge. The transfer of knowledge shall occur through verbal communication between the Contractor and MetroGIS support staff during the installation and through the Contractor explaining the contents of the required Draft Technical Report [see Section VII (4)], describing the solution's operational procedures, including but not limited to, maintenance and updating. One (1) unbound

original and three (3) copies of the Draft Technical Report shall be submitted to the MetroGIS Project Manager.

If any problem(s) arises during installation and testing in preparation for Milestone 5, the Contractor shall take all necessary measures to correct the problem(s) in a manner consistent with previous understandings between the Contractor and the Project Management Team, including but not limited to modifications of the solution and/or its accompanying documentation. The MetroGIS Project Management Team shall have ten (10) working days to submit written comments requesting modification to the contents of the Draft Technical Report. Assuming Milestone 3 is completed in accordance with the stated schedule, MetroGIS assumes Milestone 4 will be completed by August 2, 2002.

5) Final Presentation

The MetroGIS Project Management Team and Contractor shall jointly present all aspects of the fully operational version of the preliminary final deliverable (modified to incorporate the modifications identified in Milestones 3 and 4) to a joint meeting of the MetroGIS Coordinating Committee and Policy Board for final review and comment. The Contractor shall have responsibility for documenting any design-related comments received and any conclusions reached.

The Contractor shall have five (5) working days to submit a written summary to the Project Manager of any design related matters discussed at the Presentation and modify the preliminary final deliverable, assuming the desired changes are within the agreed upon scope. Assuming the Milestone 4 is completed in accordance with the stated schedule, MetroGIS assumes Milestone 5 will be completed by August 16, 2002.

6) Project Wrap-Up Meeting

Meeting with the Project Management Team to review the Draft Project Summary Report, including all appendices (Section VII, 5). The Contractor shall submit one (1) unbound original and five (5) copies of the Draft Summary Report to the MetroGIS Project Manager seven (7) working days prior to this meeting. The Project Manager will forward the draft document to the Project Management Team for review and comment. The Contractor shall have five (5) working days following the Wrap-Up meeting to submit the final Project Summary to the Project Manager. MetroGIS assumes Milestone 6 will be completed by August 30, 2002.

III. Design Assumptions

1) *Funding:*

The MetroGIS Project Management Team estimates that up to \$90,000 will be required to design and implement a mechanism to accomplish the automated distribution mechanism objectives set forth in this scope of work, including any necessary software. If the Team's cost estimate is not adequate to accomplish all of the stated project objectives, including bid options, a phased proposal is requested which identifies the objectives can be accomplished with the budgeted funds and the objectives (or portion thereof) would require additional funds and the cost for each.

2) *Internet Map Services:*

For the purposes of this proposal, an Internet Map Service is defined as a map that is published over the Internet. It may contain a single data layer (e.g. imagery, elevation, and land use) or a collection of complimentary data layers. The Contractor will **not** be responsible for designing or implementing the Web Mapping Service solution for MetroGIS that will be implemented under MetroGIS' NSDI Grant Award (see the Background Section in the main Request for Proposals document - National Spatial Data Infrastructure (NSDI) Grant Award for details). However, since the web mapping services that will be implemented through the NSDI grant will also require the same security measures as the data delivery mechanism, it is hoped that the security module developed for the project described here, will also be able to provide security for the MetroGIS' web map services without duplication of functionality. (Exhibit 2) shows the envisioned relationship between these projects.

3) *Ownership of Source Code:*

The Metropolitan Council will own all customized source code, on behalf of the MetroGIS community, and shall have the authority to sell or share the code with any organization it believes is in the interest of the MetroGIS community.

4) *Distribution Mechanism Host:*

The Metropolitan Council is currently the host for MetroGIS DataFinder (www.datafinder.org). The Project Management Team believes there is a substantial efficiency to be gained by also having the Metropolitan Council to host the proposed Data Distribution Mechanism defined in this scope of work, in terms of utilization of existing hardware, software, support staff capacity, and an existing relationship with a e-commerce service provider. If a freestanding solution would provide efficiencies greater than could be realized if the Council hosted the mechanism, the Project Management Team encourages the Proposer to document these efficiencies. The Proposer should assume that MetroGIS will consider modifying currently endorsed roles and responsibilities if efficiencies can be gained by doing so. Efficiency in distribution means minimizing manual processes and duplication of effort for both the distributor and for the data user.

IV. Design Requirements

The design requirements are grouped into three sections, General Requirements, Specific Requirements, and Bid Options. The General and Specific Requirement sections outline the items that are required for this project. The Bid Options section below lists items that are favored but are not requirements. Providing information about bid options is optional.

General Requirements

1) *Optimized Solution:*

The Proposer is encouraged to provide a scalable design that optimizes efficiencies for the data user and for data distribution.

2) *Internet Access:*

The website that will hold (or link to) proposed data delivery system shall be MetroGIS DataFinder (www.datafinder.org). Currently, the Metropolitan Council hosts the MetroGIS DataFinder web

site. Information about the software and hardware configurations of the MetroGIS DataFinder web server can be found in Exhibit 1.

3) *Proposed Design Solution and NSDI Grant:*

The Contractor must identify consistencies and inconsistencies of the proposed design with the protocol being tested in the NSDI Grant Project (OGC-Compliant Map Internet Services). This must include, but should not be limited to, a discussion of the feasibility of a shared security mechanism for the proposed solution and the web map services developed under the grant. Please see Exhibit 2 for how MetroGIS envisions the relationship of this project and the NSDI grant.

4) *Semi-Automated Licensure:*

For requests that involve licensing, assume that some of these procedures will be manual but the objective is to automate to the maximum extent possible. The user must submit a signed original paper license which must be in-hand before a user will gain access to restricted-access data sets. When this manual process has been completed, the system must be easily updateable by MetroGIS staff so that the user may then obtain web access the data set(s) for which they have obtained a license.

Specific Requirements

1) *Web Map Server Software:*

The design must include software that serves GIS data over the web. This software must function with the existing server and web server software at the Metropolitan Council (see Exhibit 1).

2) *Supported Data Sets:*

The design must accommodate effective and efficient distribution of both vector and raster GIS data sets. The vector GIS data sets should be assumed to be in ESRI's Shapefile format. It is assumed that this format can be readily imported by the most, if not all, of the major GIS software platforms used by the MetroGIS data user community (AutoDesk, ESRI, Intergraph, MapInfo, and SmallWorld software). If the proposed solution is able to also provide data in additional formats, please give this information in the proposal. Raster data sets should be assumed to be in ESRI's Grid format, LizardTech's MrSID or Tiff image format. If another storage format would increase the performance, security or any other aspect of the solution especially for large data sets (e.g., the parcel data set includes approximately 900,000 features), the necessary software and other associated costs should be included in the proposal.

3) *Supported Data Set Sources – Scalability & Distributed Data Sources*

The design must provide a distributed and scalable solution that would allow data sets to be housed at multiple locations (other web map servers). For example, the regional parcel data set is made up of parcel data from seven counties. If one or more counties chooses to host their parcel data on their own web server, the design proposed for MetroGIS must have the flexibility to access that data set and provide seamless and transparent access to it as though it were one data set housed locally. The proposal must address how this functionality would operate, anticipated difficulties, if any, and the required data formats. Note that the MetroGIS community uses various GIS packages (see Item IV, 2, above), so a solution that addresses these different software packages and data

formats and which uses an industry standard protocol would be preferred (i.e., OGC-compliant map service).

4) *Security Module – Security and Access Requirements:*

The proposed solution must provide a secure environment in which specified users (e.g., non-profit and for-profit interests) would have limited or no access to certain specified data sets. These restrictions are based on two components, the type of users (academic, government, non-profit, and for-profit), and the rules surrounding each data set (no license, license, fee, etc.). The proposed solution, therefore, must include a module or mechanism for tracking both the rules for each data set *and* the status of each user and their level of access to *each* limited-access data set. In addition, some of the limited-access data sets are also limited by time – meaning that the license is only valid for a given duration of time. The security mechanism must also incorporate this variable into the solution. This will result in a mechanism that will require a unique user name and password for each user that is accessing a “limited-access” data set. It is anticipated that this security feature will be initiated when the user attempts to browse a map that contains a limited access data set, but Proposers are encouraged to solve this issue in the best way possible. The proposal should include details of how the user and data constraints will be stored and accessed. The user and data-related information tracked in the security module must be easily modified by the system administrator.

5) *Relationship of Security and Access Requirements and Web Map Services:*

OGC-compliant Web Map Services implemented as part of MetroGIS’ NSDI Web Mapping Services grant may contain some data that has the same security requirements as the data distribution mechanism described here. It is of great interest to MetroGIS that the security procedures and mechanisms developed for the data delivery solution also provide security to MetroGIS’ NSDI-grant funded web map services.

6) *Web Client Map Interface Functionality*

The proposed design must allow the user to browse the data sets in on-line web maps. The availability of individual data sets within these web maps must be dictated by the user’s security access (details on security provided above). The current vision for MetroGIS is to make several different maps available to the users that would contain different data sets. While each map would contain different data sets, but the map interface and its functionality would be the same for each map. The web map will allow the user the following capabilities:

- Tools for browsing and examining the data including but not limited to: zoom, pan or re-center, identify or information (show tabular data associated with a selected feature), query and clear query selection set, buffer and measure.
- A quick zoom capability that would allow the user to quickly zoom to areas or features commonly used by the MetroGIS community, including but not limited to: municipal boundaries, school district boundaries, county boundaries and watershed management area boundaries.
- An overview map that provides the location of the main map.
- A listing of the data sets in the map that provides both an legend showing the classification of the data set and gives the users the ability to toggle on and off the visibility of the data set.
- A link to the metadata (on DataFinder) must be available for each data set in the map.

- A method for creating a map that is suitable for printing. Such a map should include, at a minimum the following items: the contents of the current map, the legend showing symbols and classifications for the data sets currently visible, a scale bar, a north arrow and a title. In addition, the map contents should be available to save to an image file and or copy to a clipboard file for use in other applications.

7) *Web Client – Map Interface Browser and Platform Compatibilities*

- The web map interface must be available and fully functional in recent versions most Internet browsers, including Netscape Navigator and Internet Explorer.
- The web map interface should be fully functional in Internet browsers on most popular computer platforms and operating systems used by the MetroGIS community, including Windows NT, Windows 98 and 2000 on PC platforms and UNIX based operating systems.

8) *Web Client Functionality – User Defined Area of Interest:*

The proposed design must provide the user with the ability to define a custom geographic area of interest within the seven-county metro area that can then be used to subset (or clip) the data set(s) for extract and download. The user should be able to define this area using several different procedures including but not limited to:

- A rectangular bounding box (e.g., the extent currently shown in the map – or a rectangle drawn interactively by the user on the map.)
- Drawing an ad hoc polygon on the map
- Spatial query. Use one or more features from a data set as a template or “cookie cutter” to define an area of interest. For example, a user may want to use a school district boundary do define an area of interest. Note that this should include the ability to select not only polygon data sets, but also to define an area of interest by selecting a point or line layer and then using a buffer to obtain an area of interest. (For example, create a buffer around area around a selected section of the Mississippi river and then use that buffered area as the “area of interest” for subsetting another data set. It is particularly important to note that this method may result in the download of datasets that do not necessarily have a rectangular bounding box.)
- Attribute query (e.g., Select features in a data sets with the following attributes “Municipality Name = ‘Roseville’”. Use the resulting selection set as the subset of data to download.)

9) *User Defined Data Themes:*

The proposed design must provide the user with the ability to self-define the theme(s) of data they are interested in from those available for the desired geographic extent. For example, if roads, parcels and county data sets are visible in the map, the user must be able to specify which of the data sets they would like to download in their area of interest.

10) *Data Delivery Format:*

The proposed solution must generate an ESRI Shapefile format data set for download or extract. It is assumed that this format can be readily imported by the most, if not all, of the major GIS software

platforms used by the MetroGIS data user community (see IV, 2, above). If the proposed solution is able to also provide data in additional formats, please provide this information in the proposal.

11) *Data Delivery Size Considerations:*

If the size of the data to be delivered to the user is less than a specified file size, the request for data should be fulfilled immediately via email/FTP. If larger than the specified file size, the application must notify the requester with a message that warns of the large file size and potential download problems. This message must be modifiable by the system administrator (i.e., reduce number of dataset, reduce area of interest).

Bid Options

The following Bid Options items that are favored but are not requirements. Providing this information is optional for the bidder. Please specify whether it is possible to do this and provide the additional cost, if any.

1) *Enhancement to Web Client Functionality – User-Defined Fields or Attributes of Data Sets*

Provide the user with the option of specifying which fields or attribute(s) will be included in a data set(s) that they have chosen to download or extract.

2) *Enhancement to Data Access and Security Module*

a) *Online ordering of “partial” data sets*

MetroGIS would like to provide the option of purchasing the complete or partial data set online using the e-commerce solution, where access by a specified class of user requires payment of a fee. The Metropolitan Council has an existing ISP (ArchWing) that provides an e-commerce solution for its Transportation Division that the Council prefers to use for all of its e-commerce needs, including MetroGIS, if this capability is pursued. To implement this function, the data distribution needs to have a mechanism that can accomplish the following:

- i. Store information about how much a data set costs on a per feature basis.
- ii. Calculate the full or partial area for the data sets based on the per feature cost.
- iii. Pass the cost information to the e-commerce engine.
- iv. Receive the acceptance or denial from the e-commerce solution and update the security module that the user has successfully “paid” and is, therefore, allowed access to the data set.

b) *Add Extent Information to User profile*

Provide the option for the user profile defined in the above security module to contain a geographic extent(s) that is associated with each limited-access data set for each user. This option would be used to define the custom areas for download for a given dataset based on licenses and fees paid as described above in 2a. Then each time the user revisited the web site, they would have access to the same geographic extent to download updates to the data set. Areas outside the defined extent would not be accessible for download.

EXHIBIT 1

Metropolitan Council's Current server / software specifications

- Windows NT Web Server (Pentium P3 Xeon, 4 CPU 550 Mhz, 1MB Cache, 2.4 GB RAM, 100 GB hard disk)
- Web server software: Internet Information Server 4.0
- ESRI ArcIMS (map server software)
- Unify Servlet Exec (required for ArcIMS to run with IIS)
- Active Server Page Extensions
- NSDI Clearinghouse Software: Isite 207i for Windows NT (Clearinghouse gateway provided by Land Management Information Center)
- Web Trends (web usage tracking software)
- The Council plans to implement Oracle for GIS data storage in the near future. No spatial component has been selected.

EXHIBIT 2

Envisioned System Design Concept

