ANALYSIS OF THE SOLICITATION PROCESS IN MONTGOMERY COUNTY

An Interactive Qualifying Project Report Submitted To:
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Abstract

The purpose of this project was to document the solicitation process, create human-readable and computer-interpretable documentation, and recommend performance metrics for the Office of Procurement in Montgomery County Maryland. Our research methods included analyzing the county Procurement Guide, conducting a case study of actual solicitations, and holding interviews with procurement staff. As a result, we were able to create a procurement process flowchart, XML for all documents, and a list of performance measures.

Authorship Page

This project was a collaborative effort by all three group members. The sections have all been written and revised jointly. Every section demonstrates the collective understanding of the project by our group as a whole.

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Table of Contents

List of Tables / Figures

1 Executive Summary

Montgomery County is a self-governing county located just outside Washington, DC in Maryland. The County Government strives to provide its citizens with good services that are carried out in a timely and cost-effective manner. To achieve this objective, the County looks towards its Office of Procurement, "to obtain the right products or services in the right quantity; for delivery at the right time to the right place; from the right source; at the right price" (2004, "Office of Procurement").

To carry out their above-stated goal, the Office of Procurement must work in an efficient and effective manner. To improve their process, the Montgomery County government has granted the Office of Procurement $119,000 to buy and implement a business process management system (BPMS). With this system, the Office of Procurement hopes to have its procurement process time shortened, its documentation consistent, and its communication more effective.

To implement the business process management system, a thorough documentation of the entire process, documents, and actors involved needs to be completed. As a result, the Office of Procurement requested the assistance of our project group to analyze the current solicitation process and create a list of measures with which they can assess their progress.

To carry out our goal of documenting the solicitation process in both human-readable and computer-interpretable forms and recommending performance metrics we adopted several methods of social and computer science research methods. We first conducted a thorough read through of the Procurement Guide. This first step gave us a full understanding of the entire procurement process, as well as details to the steps involved in each of the nine types of procurement that the Office conducts. The second research method we conducted was to

perform a case study on two types of solicitations: Invitation for Bid (IFB) and Request for Proposal (RFP). We felt that these two types of solicitation would give us an understanding of the two main types of procurement, Competitive Sealed Bids and Competitive Sealed Proposals, which would then help us to more easily understand the other less complex types. The third method of research was to conduct interviews with a Procurement Manager, Procurement Specialists, and Budget and Management Specialists. The goal of these interviews was to obtain information about the procurement process, the performance measures, and to verify our work as our project unfolded. The last research methods we employed were to learn about Microsoft Visio and Altova XMLSpy. Visio is the computer program that was used to create our diagrams and flowcharts; XMLSpy is the computer program that we used to write our computer-readable documentation, or XML. We spent time experimenting with the programs and researching what they offered until we felt we had enough information to use them.

As a result of our research, we submitted two forms of documentation and a list of performance metrics. The human-readable documentation was presented in the form of a flowchart. The flowchart documented the entire procurement process from when the initiating memo is sent to the Office of Procurement until the contract between the County and the vendor is signed. The second type of documentation we submitted was the XML. The XML is a representation of all the documents involved in the solicitation process in a computer-readable format. The last result of our project was the list of performance metrics. These metrics included recommendations to measure events or processes that would be a direct result of the implementation of the business process management system as well as events or processes that currently exist in the solicitation process. These metrics can also be used to establish

benchmarks defining the current state of the process against which improvements and changes, such as the addition of the BPMS, could be measured.

We recommend that our results be used to improve the Montgomery County procurement process as implemented by the Office of Procurement. The process flowchart can be used as a tool for new employees who are learning the process or as an appendix to the current Procurement Guide. The XML can be used by the business process management system to standardize documents' formats as it can be used to format Microsoft Word document templates. Lastly, the performance metrics can be used to find and assess any problems that occur in the solicitation process and make changes to better it.

2 Introduction

As an organization grows, all of the duties it is responsible for grow as well. In many cases, processes that were once simple can become cumbersome and hard to manage. Problems occur especially when the organization begins to get larger and the processes are forced to scale along with it. Procurement is just one of the many examples of a process, which when not updated, can lead to less efficient functioning of the organization. For the organization to continue to operate in an efficient way, it must periodically take time to analyze and adapt its methods to suit these changes.

In Montgomery County, Maryland, the Office of Procurement has existed for many years. Since its inception, the Office has grown in both budget and number of employees. It currently functions with twenty-eight employees and an operating budget of about $2,500,000 per year (Montgomery County Office of Procurement, 2004, "Budget"). Furthermore, it procured $583 million in goods and services for the county in fiscal year 2004 – one of the largest county procurement totals in the country (Lee, personal communication, October 30, 2004). With this growth, the tasks of the organization have scaled with the organization itself, but the processes used have not changed significantly, causing the employees to continue to use their usual methods of completing tasks; see Appendix B for additional information. Montgomery County has reached a point where these methods need to be analyzed, and then updated, to reflect the organizational growth.

Organizations and companies are updating the way they conduct their businesses in order to take advantage of new computing technologies. Many organizations, however, have had trouble because they have not chosen the technologies that best fit their needs. Others that have chosen technologies wisely have seen a wealth of improvements throughout their organizations.

For example, in 1999, Qualitel Corporation, a Redmond, Washington-based contract electronics manufacturer, earned $2.85 million in revenue (Intuitive Manufacturing Systems, 2004, “Updating technology results in big payoff for turnkey electronics manufacturer”). According to an article in Intuitive Manufacturing Systems, this revenue increase came just one year after implementing a new business model as well as a new computer-based processing system called the *Intuitive ERP (Enterprise Resource Planning) System*. Qualitel's revenue increased 471 percent earning them a #6 ranking in the Puget Sound Business Journal's "100 Fastest-Growing Private Companies" in Washington State. Qualitel first recognized that the ideal way for success resulting from technological implementation is by researching and documenting the way the process currently operates and identifying ways to improve it. Then, they created criteria for choosing a BPMS (Business Process Management System) that they felt would best fit their process. Finally, they implemented the new system and, as a result, greatly profited from it. It is possible that factors other than the BPMS implementation contributed to the earnings increase. The article, however, stresses that the improvement was mostly due to the BPMS.

Currently, the Montgomery County Office of Procurement has a procurement guide that states the mission of the Office as well as the tasks and steps that the Office performs. The problem, however, is that this guide provides a general description of the process and is mainly for use by a vendor or a county citizen and not by the Office personnel themselves. What the Office of Procurement lacks is a detailed systematic description and a documentation set for the entire solicitation process that can be used internally. This type of documentation can help to identify both positive and negative aspects of the solicitation process. The documentation’s function is to more easily identify future problems, assess the overall procedure, and allow for modernization of the process. In addition, this documentation will lead to the creation of a set of

criteria that will describe what features of a computer-based BPMS will best fit the needs of the Office of Procurement. This project's purpose is to document the procurement process in a way that will allow the Office to procure an appropriate BPMS.

The goal of this project was to document the solicitation process in both human and computer interpretable forms and recommend performance metrics that will allow the Office to evaluate its process. To assist the Office of Procurement with this goal, we developed several objectives. We researched the current solicitation process and documented a systematic analysis of the process in the form of both XML schemas and a detailed flowchart. We created this documentation by studying the county's procurement guide and by meeting with several procurement specialists to understand what forms they work with and how they fill them out. Lastly, we spoke with the county program measures coordinator as well as the Office's management and budget specialist, studied other metrics in other county departments, and used our previous analysis to derive a series of performance metrics to evaluate the procurement process.

3 Background

In this section, we discuss a number of topics appropriate to the content of this project, including information about Montgomery County, procurement, business process management systems, and performance metrics. This research provided us with the background necessary to design and perform the steps in the methodology, and therefore carry out the project goal of documenting the solicitation process and designing performance metrics.

3.1 The Montgomery County Government

A county government's main objective is to administer public policy and assess the needs and affairs of its citizens. For example, Durham County in North Carolina has the goal of enhancing the quality of life of its residents (Renfrow, 2004, "Durham County Budget and Management Services"). Montgomery County states its goal as "helping to make Montgomery County the best place to be through efficient, effective, and responsive government that delivers quality service" (Montgomery County, 2004, "Mission Statement"). Montgomery County is Maryland's largest, most affluent, and most educated county. The county is 507 square miles in area and has a population estimated to be 855,000 ("Department of Housing and Community Affairs," 2001). The government is composed of three parts: an executive branch, a legislative branch, and a judicial branch, which work to serve the citizens (Montgomery County, 2004, "Montgomery County Organization Chart").

3.2 The Office of Procurement

This project involved analyzing the solicitation process in Montgomery County's Office of Procurement. Understanding what a procurement office is, what it does, and how it performs its function was essential to the conduct of this project.

3.2.1 The Role of a Procurement Office

Government exists to serve the people; in order to do so, it requires goods and services for itself. The Office of Procurement exists to provide these services to government departments in a cost effective and timely manner. The Office also provides mechanisms for dealing with problems in the acquisition process, such as invalid or cancelled bids, damaged or defective goods, or otherwise imperfect acquisitions. According to the Montgomery County Office of Procurement's website, its purpose is to oversee "a purchasing process that assures impartial and equitable evaluation of bids and proposals from vendors" and to help "agencies to establish fair and reasonable contracts" (2002, "Office of Procurement").

3.2.2 The Objectives of the Office of Procurement

The Montgomery County Office of Procurement has a list of objectives that they seek to achieve (Montgomery County Office of Procurement, 2004, "Office of Procurement"):

1. To obtain the right products or services (meeting quality requirements) in the right quantity;
2. For the delivery at the right time to the right place;
3. From the right source (a responsive and reliable supplier);
4. At the right price.

In Massachusetts, the City of Worcester's Purchasing Department's Purchasing Guide lists similar objectives (Orrell, 2004, p. 2):

A) To procure materials, supplies, equipment, and services at the lowest possible cost consistent with the quality necessary for the proper operation of the various departments, thereby attaining the maximum value for each public dollar.

B) To maintain the City's reputation for fairness and integrity and to promote the impartial and equal treatment to all who wish to conduct business with the City.

C) To encourage a mutually cooperative relationship with requesting departments recognizing that successful purchasing is a result of team planning and effort.

D) To promote social and economic goals such as encouraging small, minority and women-owned businesses to participate in bidding of City purchases.

The two procurement offices, despite geographical separation, share similar goals.

3.2.3 Basic Steps in Procurement Operation

The Office of Procurement has two main operations. The first, called the *pre-award process*, begins when there is a need for a specific good, service, or construction and ends with the selection of a bid and the signing of its contract. The main steps in this operation include:

- Solicitation development: an *initiating memo* is generated by the *using department* and sent to the Office of Procurement, indicating the need for a good, service, or construction. The product of this step is an invitation for bid (IFB) or a request for proposal (RFP), depending on several characteristics of the individual solicitation.
- Advertising and solicitation: the IFB or RFP is advertised to interested vendors in any of several possible ways, including direct mail, newspaper advertisement, and electronically.
- Vendor evaluation and selection: bids that the Office receives are evaluated by the Office and the *using department*, and a winning bid is selected.
- Contract negotiation and execution: all remaining requirements are fulfilled for final contract writing and signing. These requirements include satisfying bonding

requirements and allocating budget funds. The contract enters an execution state at this point.

The second operation, called the *post-award process*, ensures that the specifications set forth in the contract are met and followed. This process starts when the contract is signed and ends with its completion. While a contract is in effect, problems can arise. For example, if a contractor does not fully meet the specifications of a contract, the department to whom the goods or services were disbursed notifies the Office of Procurement for assistance. The Office will then contact the contractor and resolve the problem.

3.3 Business Process Management System and the Current System

Business process management systems (BPMSs) not only use computers as part of the business process, but also integrate them into it, allowing automation of many different aspects of business functionality. Montgomery County would like to take advantage of a BPMS in its procurement office, not only to save time and money, but also to improve the experience of *using departments*, and vendors. Therefore, background information regarding BPMSs was beneficial to the overall understanding of the project.

3.3.1 The Need for a Business Process Management System

In a conference presented by Digital Consulting Institute, one of the largest IT software producers, it was stated that businesses that are implementing BPMSs are taking a clear lead over those without such computer programs (DCI, 2004, "Analysts"). Montgomery County is also looking to join the ranks of these modernized organizations by adding advanced computing technologies to its processes. Implementing a new system will make the process timelier, more organized, more accessible, and more understandable. It will also allow the County to use a universal documentation format such as XML.

3.3.2 Worcester Polytechnic Institute's BPMS

WPI uses a BPMS, called Banner, from SCT (Software Computing Technologies), to manage many of its processes (B. Thompson, personal communication, October 4, 2004). Banner is specifically designed for the needs of institutions of higher education. It manages class schedules, payroll, admissions, financial aid, and alumni services, amongst other things. Because it is specifically designed for institutions of higher education, Montgomery County's Office of Procurement could not use Banner, but many things can be learned from WPI's implementation of Banner that may be applicable to Montgomery County's future implementation of a BPMS.

In the early 1980's, WPI operated with many disjointed in-house systems. This situation is similar to the Montgomery County Office of Procurement's present position; there is no consistency between systems, and tasks must be replicated across multiple independent applications. WPI's administration decided that the school must move to one large, integrated system. It did not, however, have the resources to create its own. The Office is in a similar predicament; they realize that they have problems and are trying to decide whether a homegrown solution or any combination of off-the-shelf products would be appropriate for them.

WPI next created an RFP (Request for Proposal) detailing exactly what features it was seeking in a BPMS. To create this document, WPI hired an outside consultant to evaluate their processes and document them. Finally, the RFP was issued, and multiple companies responded. SCT was the only company that met WPI's price and functionality requirements. Furthermore, SCT included WPI in a shared-source program, so the school could customize the software to do exactly what it wanted.

The Office is paralleling WPI in the preceding step, in that they have outside consultants, in the form of our project team, which will document their processes, therefore helping them in their BPMS selection. However, WPI would only consider monolithic systems, and the Office is open to considering many small systems that they would integrate. When asked why WPI would only consider such all-in-one solutions, Ben Thompson of WPI replied that in the case of all-in-one solutions, the customer receives comprehensive vendor support in case of problems, extensive and complete integration of all subsystems, and the ability to easily and quickly upgrade the entire system at once. Mr. Thompson stressed that the initial cost of such a system may seem high, but in the end, a lower total cost of ownership may justify that greater initial expenditure in the form of fewer IT (Information Technology) staff.

WPI spent over a decade gradually replacing all of its custom systems with Banner. This phased implementation allowed each department to progress at a comfortable speed, minimizing downtime and aggravation for the users of the various systems. Our project team will not be directly involved in the Montgomery County BPMS selection; however, our project results will assist in both choosing the correct system and its later implementation.

3.3.3 The Current System

The Montgomery County Office of Procurement has a procurement system that is not automated by a business process management system; for more information, refer to Appendix B. As with all procurement processes, Montgomery County's Office of Procurement first becomes involved when a need for a good, service, or construction is requested, and its involvement terminates when the contract is carried out to the satisfaction of both the *using department* and vendor. This process, presently labor intensive, could have its efficiency greatly

improved with the introduction of information technology as was the case with WPI's BPMS implementation (Busby, 1962, pp. 14-15).

The first step in Montgomery County's procurement process is the receipt of a request for goods or services from a county agency, as detailed in Appendix I. The Office and possibly other parties must approve the request; exactly who must approve the request varies as a function of the immediate importance of the request and its monetary value. For example, the department head of the Procurement Office must approve emergency requests. Management software would be able to connect the requesting department directly to the Office, reducing administrative delays in processing paperwork, as well as eliminating the possibility of lost paperwork (Leonard, 2000). Furthermore, management software would give the requesting department immediate status updates on the processing of their request.

The next step in processing the request depends upon the monetary value of the request, whether or not there is only one supplier, and whether or not it is an emergency; for more details, see Appendix I. Once administrators approve a request, a process path is chosen. Who exactly approves the request and how it is handled varies based on the value of the request, its importance, whether it is competitive or non-competitive, and if there is a pre-existing contract for the same goods, services, or construction. At this point in the process, management software would be able to decide who needs to approve a given request and contact them automatically, and then use the complex set of rules established in the procurement laws to decide which specific process this particular request needs to follow. Changing procurement processes and rules for selecting them would also be far easier using a software solution, as personnel retraining would be unnecessary, allowing the Office to improve the efficiency of its system (Leonard, 2004, pp. 12-16).

The request is now either posted publicly, sent to specific vendors, or both; see Appendix I for more information. In addition, at this point, the rules of how a bid will be accepted are determined; for example, whether the County's relationship with the vendor will influence the decision or not, whether price is the only thing that matters, or whether are there are other factors. All of these factors are detailed in the Procurement Guide. A software solution can apply codified rules and determine whom to contact and how. Another advantage of a software solution at this point is in the speed and ease of contact. If the County interfaces with vendors electronically, their systems may automatically determine whether and what to bid, producing possibly instantaneous results, which would be a clear advantage to the County and the vendors (Leonard, 2004, p. 20).

After the bids are received, a winning vendor is selected. The vendor then executes the contract, and payment is transferred. An electronic procurement system can keep track of the quantity and quality of the business done with each vendor, and this information could help select better vendors in the future.

3.4 XML

XML is cutting-edge technology that appears poised to become the lingua franca of electronic data exchange. XML stands for "eXtensible Markup Language." It is not really a language in and of itself, but more a language for describing languages, "a meta-language" (Wikipedia, 2004, "XML"). XML has two main parts: a schema and a document. The schema is a set of rules that describes the format of a document, such as what tags (types of data) can appear at what points in the document and what type, such as number, character, or date, the data can be. The document holds the actual data in the format defined by the schema.

3.4.1 The Use of XML

XML is designed to be computer interpretable as well as human readable, allowing many computer systems to interact effectively while also allowing people to manually create, edit, and understand the code relatively easily. In this way, companies can define strict yet extensible data formats allowing different companies with different software to quickly, easily, and inexpensively exchange information. Computers can then filter the data so people can more efficiently use their time to make better, more informed decisions, thereby saving the organization time and money. One example of an XML implementation is in the steel industry; XML is used to document processes and exchange data about various characteristics involving the manufacture of steel and related products (Petry, 2004, pp. 14-20). This data set allows many steel consumers and producers to more easily exchange information.

3.4.2 EDI

XML supersedes a system known as EDI (Electronic Data Interchange).) EDI came into existence in the 1960's, an era in computing when every character mattered because computing power and memory were very expensive commodities (Wikipedia, 2004, "EDI"). Therefore, this language is not human readable, making it difficult to debug and write software for. Similar to XML, EDI systems have the idea of a schema, except it is written as a contract in human language between two people, which they agree to implement in their computer systems. The lack of a computer interpretable format definition means that EDI streams are difficult to debug in case of errors, and also difficult to change. For example, in XML, if a new property was required, one could simply add it to the schema and begin using it, and all legacy systems would continue to function. In EDI, adding such a property would require instant modification to all systems. Because of these readability and flexibility issues, as well as others, XML is the choice

language for new systems. Furthermore, many are upgrading their legacy systems to support XML, as in the aforementioned case of the steel industry.

3.4.3 XML in Montgomery County

In Montgomery County, our project group was charged with developing XML schemas to document the solicitation process. By describing the process in XML, government departments, the Office of Procurement, and vendors now have a standardized electronic way of exchanging data. The new BPMS will eventually be able to use these XML documents to better manage the entire procurement process; please refer to Appendix B.

3.5 Performance Metrics

Performance metrics are the individual measurements of various properties of a process that together are used to gauge performance of this process over time. Without performance metrics, there would be no way to determine if a process is becoming more or less efficient as a function of time, if a change in procedure has a positive or negative impact, or if the process is having the intended results. Many public and private entities use performance metrics to evaluate various components of their organizations. In fact, the federal government and many state and local governments now mandate performance measurement systems to be in place and available for public review.

Montgomery County has a system in place for publishing performance measures. On a yearly basis, they publish a document titled, “Montgomery Measures Up!”

> In this document, programs are assessed using a "family" of input, output, efficiency, service quality, and outcome (results) measures. Together, these measures provide a comprehensive overview of program performance from multiple perspectives, ranging from what it costs (inputs) to what it achieves

(outcomes) and how efficient it is in producing those results (Montgomery Measures Up!, 2004, cover letter).

This document is used both internally and externally. Internally, the metrics allow the individual departments to justify their budget requests. Externally, the metrics offer citizens a way of reviewing how their tax dollars are being spent and to see proof that their government really does work towards improving its services.

4 Methodology

The goal of this project was to document the solicitation process in both human and computer interpretable forms and to recommend performance metrics. We employed several social science research methods as well as computer science methods, which we will describe in this chapter.

4.1 Procurement Guide

The first step of our research was to study the Montgomery County Procurement Guide, a copy of which is found in Appendix I. We performed this research before anything else for several reasons. First, we needed to know enough about the procurement process to be able to select past solicitations for a case study. Second, we needed to be able to speak intelligently with others in the department and have basic knowledge about their procurement process. Third, we planned to do a "top-down" approach to learning about the process, meaning that we wanted to start with the big picture, having little detail, then add more and more detail. The Procurement Guide is an overview of the process, without specific documents included, so it gave us a solid beginning for that approach.

Each of the group members independently read the Guide and took notes on what he or she did not understand. A number of these notes were about wording or decisions that appeared to be ambiguous. For example, we did not know the definition of a "public entity," nor could we understand how bridge contracting, a specific type of solicitation, fit into the process like the rest of the procurement types. This first reading gave us each a preliminary understanding of how the process works, and provided a source of draft interview questions as well as discussion points amongst ourselves.

After the preliminary independent reading, we read the entire Guide together, stopping to work on a number of items as we did so. As a group, we created a unified list of interview questions, criteria for case study candidates, a list of the different solicitation types, and a flowchart of how the cost of a desired good or service affects what type of solicitation it becomes. From our first reading, we realized that cost was the deciding factor of what steps a procurement must take, so we looked in depth at how we could form a decision tree based on cost. This decision tree later became the process flowchart (see Appendix D).

As the last step in our study of the Guide, we eliminated from consideration those parts of the process that were outside of the scope of our project, which was the solicitation process. We chose to perform this elimination after a thorough reading and discussion of the Guide so that we did not accidentally eliminate any part of the process, marking it as out of scope, when we did not really understand it well enough to make this decision.

After thoroughly evaluating the Procurement Guide, we had a firm, high-level understanding of the procurement process. We knew who the actors were and what roles they played at each step of the process. We also had a preliminary list of documents created throughout the process, as well as the information required to start a flowchart of the process. Most importantly, we had a collection of questions and criteria for interviewees, as well as the criteria for case study selection, which lead us into the next phases of our research.

4.2 Case Study

While reading the Procurement Guide was helpful for understanding the ideal way the process should work, it was no substitute for seeing the process in its completed form and looking at exactly what happened along the way. We decided to perform an illustrative case study on past solicitations in order to see what the documents and processes involved were.

4.2.1 Obtaining Solicitations

Two solicitations were selected for us by John Lee, one of the two managers of the Office of Procurement, based on the criteria we provided. We asked him to find us some instances of past solicitations that resulted in typical Invitations for Bids (IFBs) and Requests for Proposals (RFP's). We chose to look at IFBs and RFPs in particular as our research of the Procurement Guide showed us that these instances were the most complex, and all of the other types were essentially subsets of them. He recommended that we use recently completed solicitations so that we would be able to discuss them with the specialist who prepared them without adding the difficulty of asking specialists to remember issues that might be months or years in the past. In addition, looking at solicitations that are more recent would allow us to see instances that included any recent changes in laws or requirements that might change the content of the documents.

4.2.2 Analyzing the Solicitations

When we obtained the two cases, we saw that the estimated prices of the procurements were very different. This difference suited our needs quite well, as it allowed us to analyze different ends of the price spectrum. Our analysis began by looking through all of the involved documents in date order, including: all memos sent, emails exchanged, corrections made at various points, and the final solicitation documents generated. One solicitation ended with an IFB, the other with an RFP. These IFB and RFP documents were generated from boilerplates (templates) with several other required forms augmenting the base documents. We were able to identify several key documents that we would need to characterize in XML later. We also were able to see that some documents, which existed in one of the solicitations, did not exist in the other.

To further our understanding of the two cases we were looking at, we spoke with the *procurement specialist* who prepared one of them, Pat Donnelly. The interview lasted about an hour and was held in a small conference room. Our goal for this interview was to go through the IFB and obtain an understanding of the process and the documents involved. We sat with Ms. Donnelly and went through the case she had prepared page-by-page until we fully understood what each of the involved documents signified, why they were needed, who generated them, and how they could vary based on the *using department*, the good, service, or construction being procured, the cost, and various other factors.

4.2.3 Benefits

Reviewing past solicitations was valuable for several reasons. First, it gave us a better understanding of the process for preparing a solicitation. Second, it allowed us to see what documents were used for two specific types of solicitation. Third, it helped us generate the list of document fields that we needed in order to characterize them in XML. Fourth, the case study research generated more questions about the process and documents for interviews.

4.3 Interviews

One of the most important places we looked for information about how the procurement process operates was with the Office of Procurement staff. By conducting interviews, we were able to have many questions answered. These questions ranged from whether our idea of how the process worked was accurate to whether the documentation we created was correct.

We chose to conduct two types of interviews: unstructured and semi-structured. An unstructured interview contains no predetermined questions; a semi-structured interview is characterized by a set of questions that can be changed or added to as the interview is conducted. The reason we chose to conduct these types of interviews was to be able to remain as open and

adaptable as possible. In addition, these styles ensure that the interviewee is comfortable and feels free to tell us what he or she thinks is most important.

4.3.1 Manager

The first interview conducted was with John Lee, a manager at the Office of Procurement. The role of a manager is to oversee the work of seven or eight procurement specialists. A manager is also a procurement specialist, but one with more experience and authority. We chose the semi-structured interview style for this particular interview because we were searching for more information, and we could not know what other questions we would need to ask until some of the preliminary ones were already answered. This interview was held in a small conference room and was an hour and a half long. The list of questions prepared came primarily from our research of the Procurement Guide. These questions ranged from the misunderstanding of a term to the flow of the solicitation process.

The interview began with an explanation of our project goal and the reason for the interview. In this case, there were three reasons: to answer questions that arose when researching the Procurement Guide; to gather a list of *procurement specialists* to interview; and to obtain past solicitations on which to conduct case studies. The interview proceeded by asking the prepared questions. At times, however, when the manager was answering a question, a topic was mentioned that we were not familiar with. These situations led us to ask about the topic and go into a full discussion of it. When we felt that a topic was sufficiently covered, we continued with our prepared questions. This methodology continued until all of our questions were answered. Before the interview ended, we asked for the names of others in the department to interview, and we arranged to look at two instances of solicitations for performing a case study.

4.3.2 Procurement Specialists

The interviews we conducted with the Procurement Specialists were semi-structured. The goal of these interviews was to get a list of all documents involved in the solicitation process, an explanation of each one, and to receive input on flowcharts and diagrams that we had created. Ultimately, the knowledge gained from these interviews would be used to generate the XML schemas. We chose the semi-structured style as we had specific questions which needed to be answered, but we did not want to lock the interviewees into specific discussions, as we felt that they would be most candid and therefore provide the most information if we simply let them speak and lead the discussion

The first interview we conducted was with Pat Donnelly. A day before the interview, we gave Ms. Donnelly a copy of our process flowchart so she could look it over without any time pressure. When we conducted the interview, we discussed any problems and suggestions she had regarding this flowchart.

We also conducted interviews with Todd Collins and Tammy Dixon. These interviews were again for verification and analysis of a flowchart we had created before the interview. In the case of Mr. Collins, the documents were again provided to him ahead of time and the meeting was held at a later date. Ms. Dixon's interview was held in her office. The documents were introduced to her at the time of the interview and an analysis of each one was done with us present. In the case of Ms. Dixon, we chose to deviate from our method used with Mr. Collins and Ms. Donnelly. We felt that we had a comprehensive list of documents and a good understanding of them, so we felt it was unnecessary to wait another day for her to look over our material. Instead, we asked our prepared questions and discussed the flowchart.

4.3.3 Management and Budget Specialist

The next interview we conducted was with Marsha Watkins Thomas, Management and Budget Specialist for the Office of Procurement. The format of this interview was unstructured. We chose this format as our liaison had previously told us that she was the Office authority on performance metrics, so letting her lead the interview seemed to be the best approach for getting the most information. The interview was conducted in a small conference room and was about an hour long.

The purpose of this interview was to obtain information about performance metrics. More specifically:

- Which were currently in use
- Why they were needed
- Why they were important to the department
- How they fit into our project
- How we were going to go about finding them

We also needed to learn who would help us and what exactly we needed to do. The interview progressed with an explanation of all the above concerns by Ms. Watkins Thomas.

4.3.4 Senior Management and Budget Specialist

Senior Management and Budget Specialist John Greiner was also interviewed in the unstructured style about performance metrics. We chose the unstructured style for this interview for several reasons. First, we wanted to allow Mr. Greiner to present as much information as possible, without feeling at all restricted by our questions. Second, Mr. Greiner is the County authority on performance metrics, so it suited us best to have him lead the interview. Third,

having spoken with Mr. Greiner before at our weekly advisor meetings, we knew he was very interested in our project and was already well prepared to give us a lot of information.

The interview took place in a small conference room and lasted approximately an hour. During the interview, Mr. Greiner presented a number of documents to us, describing performance metrics in a number of departments. Furthermore, we spoke to him about our aforementioned interview with Ms. Thomas that was also about performance metrics. By asking questions about their different expectations for our project, we gained an improved understanding of what we should aim to accomplish.

4.4 Flowchart and Documents Diagram Creation

One of the results of our project is the combination of a flowchart and documents diagram that together detail the procurement process from the initiating memo up to the execution of the contract. The flowchart describes each step in the procurement process, in sequential order, using standard flowchart shapes. The documents diagram lists all documents created in the procurement process grouped by solicitation type, with each type on a different page. Below each document is the list of the fields on that particular document. These two diagrams will be a valuable resource to the Office and other County departments that use procurement. The following sections explain how we created these diagrams.

4.4.1 Whiteboard Drafting

The first step we took in creating the flowchart and the documents diagram was to sketch the process on a large whiteboard. We initially chose to use a whiteboard instead of a computer-based tool as it allowed us to quickly make significant changes, which was especially important at the early stages, as our understanding of the processes continuously changed. Furthermore, the whiteboard was large enough to allow us to view the entire flowchart at once, rather than

flipping through various pages, so we could see and understand the big picture quickly and easily. In making the first drafts of the flowchart on the whiteboard, we tested many different ways of organization until we finally settled on the cost-based decision tree that appears in the final version.

During this early stage of continuous major revision, which frequently included erasing the entire flowchart and starting over from scratch, we did not want to accidentally lose valuable knowledge or have to redo any work. To avoid the hazards that many encounter when working on whiteboards and blackboards, media that are not easily copied or un-erased, we used a digital camera to take pictures of the board at various stages. In this way, we always could retrieve old versions of our work, allowing us to feel less restricted in taking risks such as drastically changing the layout. This assurance allowed us to create a better flowchart than otherwise possible.

Once we felt that the flowchart was reasonably stable, we computerized it. Having the board free of flowchart work, we began the whiteboard drafting process for the documents diagram, using the same methods as previously discussed for the flowchart.

4.4.2 Computerization

Computerizing these two diagrams had many advantages: we could easily send them to anyone who requested them and we could easily make different versions in different sizes for wall display or inclusion in other document sets. We used Microsoft Visio 2000 for this part of the project for a number of reasons. First, the County provided us with copies of the software and recommended that we use it. Second, we had experience with it, so there would be less of a learning curve than would otherwise be required if chose a different software solution. Third,

Visio uses standard flowcharting symbols that will be familiar to people who have previously read flowcharts, making our documents easier to use.

We used five standard symbols in our flowchart. The rectangular box indicates a process, such as "execute the contract." A decision is a diamond, and its text is a question, the answer to which determines which branch is taken from the diamond. For example, the diamond may read "over $5,000." If the item is over $5,000, look for the line leaving the diamond that says "yes," otherwise follow the line that reads "no." A document is a rectangle with a curved, wavy bottom, indicating that a document is to be created or edited. For example, the contents of a document shape may read "Solicitation Advertising Form," meaning that the Solicitation Advertising Form is to be filled out at this point. A pentagon, with the point aimed down, indicates a reference to another part of the flowchart, usually found off-page. When one of these shapes is encountered, one finds the part of the chart the reference shape names, follows that chart, returns to the reference shape and continues from there. Finally, the arrow, or line, is the last shape. The arrow points in the direction of the next symbol. If the arrow is leaving a decision shape, it must have a label on it indicating the answer to the question the decision asks, so the reader knows which arrow to follow. See Table 4.1 for a summary of the symbols.

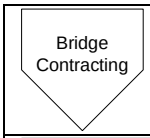
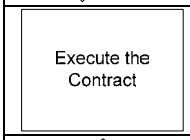
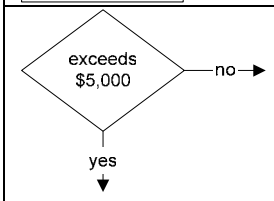
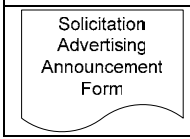
	Reference to another part of the chart name “Bridge Contracting”
	Process named “Execute the Contract”
	Decision asking “exceeds $5,000?” with attached “yes” and “no” arrows
	A document named “Solicitation Advertising Announcement Form”

Table 4.1: Flowchart shapes and examples

For the documents diagram, we used the rectangle and arrow shapes, but not in the same meaning as a flowchart. In this case, the rectangles are merely containers for text, and the arrows connect names of documents to their field lists, and the names of solicitation types to their documents. For example, the rectangles for an open solicitation would hold the name “Open Solicitation”, the name of a document used in that type of solicitation, “Risk Management Approval Memo”, then a list of fields in that specific document. Arrows would connect all of these rectangles.

We transcribed the flowchart then the documents diagram into Visio. We first put the entire flowchart onto one page, and then realized it was very hard to follow, so we split different sections of the procurement process onto different pages. In the case of the documents diagram, we ran into the same problem, so we created a different page for each of the nine types of procurement.

As we proceeded in our research, from studying the Procurement Guide to the case study to the interviews, we continuously revised these electronic versions of the flowchart and the documents diagram. At the end of the project, we reformatted both the documents diagram and the flowchart so there were two versions of each: one for 8.5”x11” paper, and one for poster-sized paper.

4.5 XML Schema Creation

To create the XML schemas, we followed a four-stage process. First, we used the whiteboard to decide what schemas to create. Second, we worked out an inheritance model and decided how all the schemas would be structured. Third, we decided on naming conventions. Fourth, we created the actual schemas on the computer using Altova XMLSpy 2005.

4.5.1 Whiteboard

Using the previously described flowchart and documents diagram, we sketched out how we wanted the XML to work. Again, we used a digital camera to take snapshots of the board so we could make drastic changes without hesitation. These initial sketches listed each document we wanted to create schemas for, how they were related, and what parts could be reused. For example, a number of documents have vendors on them, so we decided that a vendor would itself be a type, which we could reuse across a number of schemas.

4.5.2 Inheritance

After we finalized the list of documents that required XML schemas and separated out common types (such as vendor, phone number, and address), we worked on how objects should inherit from each other. Inheritance is a way to form new objects by extending the properties of existing ones. For example, we decided to create a basic type called a solicitation. Each type of

solicitation inherits from the base type of solicitation, so an IFB extends (has all the properties of its parent as well as properties unique to itself) a solicitation.

Using inheritance makes our job as well as the BPMS's job easier. For example, all solicitations have an ADPICS Requisition Form. In our case, we only have to specify what an ADPICS Requisition Form is one time, and we only have to attach it one time to the solicitation type. If we did not use inheritance, we would have to attach the form to every type of solicitation, which could lead to maintenance problems as well as additional time requirements. In the case of the BPMS, there only needs to be one software routine that handles this form, not different ones for each type of solicitation, making the program simpler and therefore less expensive and presumably more reliable and maintainable for the County.

Designing the inheritance model was not a simple task. There were many conflicts where multiple solutions seemed equally valid, and occasionally, there seemed to be no good solutions. However, by constantly trying new models, and speaking with the liaison on a number of occasions, we finally worked out a flexible, powerful inheritance model for our XML schemas. See figure 4.1 for details.

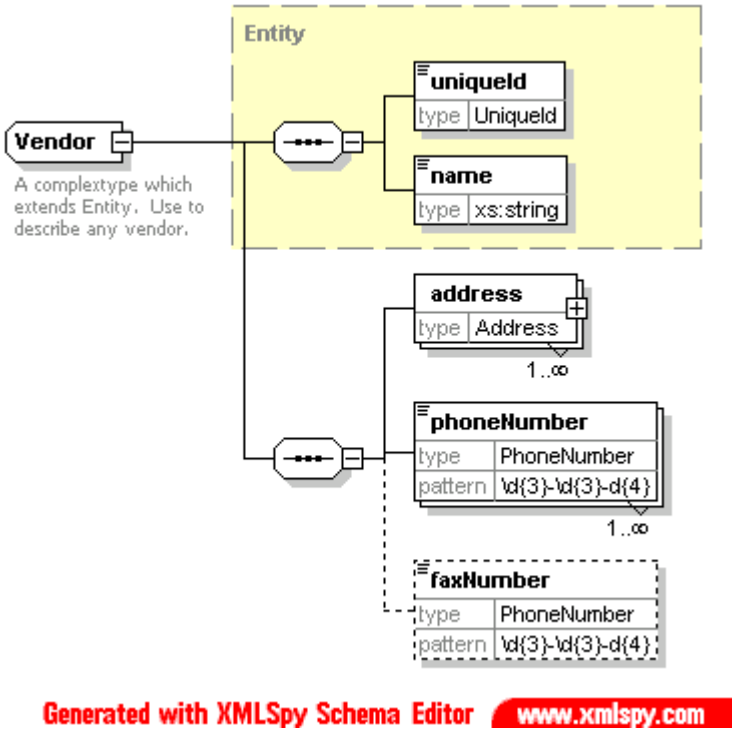


Figure 4.1: Vendor extends entity, and adds its own properties

4.5.3 Naming Conventions

In any computer program or other such resource, consistency in naming is very important. Lack of consistency leads to confusion on the part of the users, and extra time spent figuring out what the code means on the part of the developers. With this knowledge in mind, we decided to come up with and stick to a naming convention.

We decided to use the Sun Java naming convention (Sun Microsystems, 1999, "Naming Conventions"). We chose this standard as we had experience with it, and it is clear, logical, and easy to follow. We considered schemas to be classes, documents to be objects, and schema properties to be methods/variables. For more information, see Appendix I.

As for the actual wording, we worked together as we wrote the XML to be consistent. In the cases where synonyms could be used, we resolved to use only one of the words throughout

the entire schema. We also frequently read through the various schemas multiple times, looking for violations of the naming convention we had selected.

4.5.4 XMLSpy

We considered writing the XML by hand, which is technically possible, as XML is plain text. We decided, however, to use a graphical editor as we quickly realized that it can become very difficult to keep track of such a great deal of information spread out across multiple files, especially with all the special symbols and other markup specified by XML.

The product we chose was Altova XMLSpy 2005. It was recommended to us by our liaison, and we had some previous experience with it from classes at WPI. XMLSpy provided us with an environment where we drew diagrams of how the schemas worked, similar to what we had previously created on the whiteboard. In the background, the application wrote the textual XML for us. We could, however, view and edit this text at any time, which gave us the best of both worlds: a quick and easy graphical interface to get going fast, but also access to the raw text so we could perform tasks the graphical interface does not make easy.

4.6 Performance Metrics

We used a number of methods to come up with a list of performance metrics, including studying our flowchart, analyzing the OLO (Office of Legislative Oversight) Report, and talking to the management and budget specialists (Office of Legislative Oversight, 2004). We looked for ways to measure time, cost, and efficiency throughout the procurement process, but specifically focusing on our area of expertise, the solicitation process. As we studied each source, we wrote down potential metrics, including a rationale for recommending it and a method for gathering the required data.

4.6.1 Flowchart

We started by studying our flowchart of the procurement process. We looked for processes, decisions, and documents that looked like they may take a long time, be complicated, or occur very frequently. With a list of these points of interest, we designed methods to evaluate their costs, times to execute, and other measurable characteristics.

4.6.2 The OLO Report

The OLO Report was created earlier in the year to evaluate the Office of Procurement in preparation of purchasing a BPMS. The report detailed a number of ways the OLO decided to gauge the performance of the Office, including projections of these measures after a BPMS is installed. We considered some of these measures directly as candidates for our list of performance metrics, and we used others to help us form new ideas.

4.6.3 Management and Budget Specialists

The aforementioned interviews with the Office's Management and Budget Specialist as well as the Senior Management and Budget Specialist provided us with a number of ideas for performance metrics. They provided us with many suggestions as to where to look for new metrics, in addition to recommendations they had for our list. (See Appendix G for the final list of performance metrics.)

5 Results and Discussion

5.1 Understanding of the Procurement Process

To carry out the first part of our goal, to document the solicitation process in both computer and human interpretable forms, a full understanding of how the procurement process operated was necessary. To achieve this understanding, we researched the Procurement Guide, conducted a case study, and had interviews with procurement specialists. These methods led to insights on how the procurement process, more specifically the solicitation process, functions from beginning to end.

5.2 Procurement Guide Research

The Procurement Guide was the first place we went for a basic understanding of the procurement process. By reading through the Guide, we were able to create a workflow diagram of the entire process from beginning to end. The first observation made was that the process was cost-based. This finding meant that the first step a solicitation would take was based on its estimated cost value, as indicated in Table 5.1. For example, if a good or a service had a value less than $5000, it would take a *direct purchase* path and follow the steps involved in that process.

Cost	Process
<$100	Petty Cash
$100<cost<$5000	Direct Purchase
$5000<cost<$25,000	Informal Solicitation
>$25,000	Formal Solicitation

Table 5.1: Price breakup points for procurement type decision

We also learned that a solicitation could be for one of nine different types of procurements. The criteria for deciding which procurement type a solicitation would become included cost, as mentioned above, as well as other factors, as indicated in Table 5.2.

Criterion	Type of Procurement
An emergency	1.Emergency
A current contract exists	2.Bridge Contracting
Multiple vendors will be chosen	3.Open Solicitation
There is only one known vendor	4.Non-Competitive Contracting
The contract will be made with a public entity	5.Public Entity Contracting
Good or service will be based on cost only	6.Competitive Sealed Bid 7.Small Purchase (if under $25,000)
Good or service will be based on quality and cost	8.Competitive Sealed Proposal 9.Mini-Contract (if under $25,000)

Table 5.2: Criteria for deciding type of procurement

Each type of procurement is very different based on the specific need for the good or service being requested. The criterion for each differs greatly (as seen above) as do the steps that each type follows. To clearly understand all the steps involved in each type of procurement, we created a Microsoft Visio flowchart of the entire procurement process as detailed in our methodology (See Appendix D). This flowchart leads readers through criteria that will steer them to the correct type of procurement for a particular solicitation. The following is a brief overview of each type of procurement.

5.2.1 Emergency Procurement

Emergency Procurement is used when there is an immediate need for a good or service. This immediate need can happen, for example, when there is a major unexpected snowstorm on a weekend and supplies are required very quickly. The Office of Procurement would be closed and therefore could not be contacted, but for the safety of the citizens of the County, plowing

would need to be done. In this case, the responsible department would follow the steps outlined for Emergency Procurement:

- The Department requests approval to procure the service from the Director of Procurement
- The Department prepares to directly purchase the service
- The Department creates a memo signed by its department head outlining the circumstances for the emergency purchase and forwards it to the Office of Procurement within five days of the emergency
- Procurement approves the emergency request and posts a purchase order

5.2.2 Bridge Contracting

Bridge contracting, also called "piggybacking," is used when it is proper and most beneficial to the County for a procurement to bypass the solicitation process. An example of this could be if one department orders ten wooden desks. Then, a week later, a different department wants five of exact same desks that were already procured. In this case, the contract that is already in effect can be added to, or "piggybacked," and the steps for bridge contracting would be followed:

- The Department creates a memo signed by its department head supporting the desire to "bridge" a contract
- The Department prepares an ADPICS requisition (a list of vendors generated by the ADPICS system that matches the need for the good or service requested)
- The Department provides a copy of the current contract
- The Department prepares a new contract with signatures of its department head, the county attorney, and the vendor

- The Department obtains bonds (See Appendix D for more details), Risk Management approval, and completes the MFD compliance process (See Appendix D for more details)
- Procurement uses ADPICS to check if funds are available
- Procurement executes the contract

5.2.3 Open Solicitation

An open solicitation occurs when there is a need, or it is most beneficial to the County, to execute contracts with multiple vendors on a continuing basis. An example of when this situation would occur is if a community college was looking to hire five professors in its chemistry department. There would be a need to create a contract with each professor and this contract would be ongoing. In this case, the steps outlined under Open Solicitation would be followed:

- The Department creates an application process
- The Department creates criteria for acceptance or rejection of the bid/application
- The Department creates a contract that will be executed when the contractors are chosen and has it pre-approved by Procurement and the county attorney
- The Department determines that the cost of all contracts cannot exceed available appropriated funds
- Department issues the pre-approved solicitation/application and contract to the contractors
- The Department receives back the solicitation/application and evaluates it
- The Department determines the awardee(s)
- The Department obtains bonds (See Appendix D for more details), Risk Management approval, and completes the MFD compliance process (See Appendix D for more details)

- Procurement advertises the open solicitation
- Procurement uses ADPICS to check if funds are available
- Procurement executes the contract

5.2.4 Non-Competitive Contracting

Non-Competitive Contracting occurs when there is only one known vendor. For example, a department wishes to purchase the computer-based program Microsoft Excel. The only vendor that produces Excel is Microsoft. Therefore, it would be impossible to have a competitive bidding process that would consist of inviting vendors to bid. Instead, the steps outlined by a Non-Competitive solicitation are followed.

- The Department prepares a memo with justification as to why this solicitation should be non-competitive and requests approval
- The Department prepares the contract with all the terms and condition and obtains signatures of the county attorney, the vendor, and its department head
- The Department prepares an ADPICS requisition
- The Department obtains bonds (See Appendix D for more details), Risk Management approval, and completes the MFD compliance process (See Appendix D for more details)
- If the award exceeds $25,000, Procurement reviews the cost and pricing data and obtains approval from CRC
- Procurement uses ADPICS to check if the funds are available
- Procurement executes the contract

5.2.5 Public Entity Contracting

This type of procurement is done when the vendor is a public entity. An example of this solicitation type would be if the County wanted to conduct research on the amount of rainfall the

County receives per year. They could hire the local university as their vendor to conduct the study. Since the university is a public institution it is considered a public entity and therefore public entity contracting would be executed:

- The Department prepares the contract with all the terms and condition and obtains signatures of the county attorney, the vendor, and the department head
- The Department prepares an ADPICS requisition
- The Department obtains bonds (See Appendix D for more details), Risk Management approval, and completes the MFD compliance process (See Appendix D for more details)
- Procurement reviews the contract
- Procurement uses ADPICS to check if funds are available
- Procurement executes the contract

5.2.6 Competitive Sealed Bid or Small Purchase

A competitive sealed bid or a small purchase is used when the only factor that is taken into consideration is cost. This cost criterion means that the contract will be based on which vendor can supply the requested good or services at the lowest price. An example of this type of solicitation would be the procurement of 10,000 pencils. If the department agrees that the quality is not a concern to them, but rather the lowest cost, then this type of procurement would be executed. What differentiates the Competitive Sealed Bid from the Small Purchase as far as criteria are concerned is that Competitive Sealed bids are used for solicitations estimated to be over $25,000 while small purchases are for those between $5,000 and $25,000.

Competitive Sealed Bid

- The Department creates a memo listing the specification of the good and includes a quote sheet

- The Department obtains bonds (See Appendix D for more details), Risk Management approval, and completes the MFD compliance process (See Appendix D for more details)
- The Department prepares an ADPICS requisition
- The Department creates a supplement list of vendors in addition to the ADPICS requisition
- The Department prepares the contract with all the terms and condition and obtains signatures of the county attorney, the vendor, and its department head
- Procurement issues the solicitation (called an IFB, or Invitation for Bid)
- Procurement coordinates advertisement of the solicitation
- At the end of the advertisement period, Procurement collects all bids and opens them publicly at the specified time and date
- Procurement then tabulates the bids, determines the lowest bidder, and forwards the three lowest bidders to the Department
- The Department evaluates the bids and sends a recommendation for award to the Office of Procurement
- Procurement reviews the recommendation made by the Department and posts the award
- Procurement uses ADPICS to create a purchase order
- Procurement executes the contract

Small Purchase

- The Department creates a memo listing the specification of the good and includes a quote sheet
- The Department prepares an ADPICS requisition
- Procurement prepares a bid document

- Procurement makes a list of five potential vendors
- Procurement issues bids and receives quotes from vendors
- Procurement tabulates and evaluates the quotes
- Procurement determines the lowest bidder
- Procurement uses ADPICS to create a purchase order
- Procurement executes the contract (if applicable)

5.2.7 Competitive Sealed Proposal or Mini-Contract

A Competitive Sealed Proposal or Mini-Contract is used when the need for a good or service is based on both quality and cost. An example of this situation is the hiring of janitorial services. In this case, it is essential not to just accept the lowest bid but rather to investigate the quality of work that the vendor will provide and to consider those when choosing the winner. Here again, the difference between a Competitive Sealed Proposal and a Mini-Contract is that one is used for solicitations estimated to be over $25,000 and the other for those between $5,000 and $25,000, respectively.

Competitive Sealed Proposal

- Department prepares a memo including the contract terms and conditions, and the specification that will be considered
- The Department prepares an ADPICS requisition
- The Department obtains bonds (See Appendix D for more details), Risk Management approval, and completes the MFD compliance process (See Appendix D for more details)
- Procurement reviews and approves the solicitation
- Procurement prepares a list of potential bidders
- Procurement issues the solicitation (called an RFP, or Request for Proposal)

- Procurement coordinates advertisement of the solicitation
- At then end of the advertising period, the Department collects the proposals and evaluates them according to the set award method
- The Department evaluates the bids and sends a recommendation for award to the Office of Procurement
- Procurement reviews the recommendation made by the department and posts the award
- The Department negotiates the contract terms with the winner
- The Department prepares the contract document and obtains signatures of the county attorney, contractor, and the department head
- Procurement receives all the proposals at a specified time and date from the department
- Procurement reviews the opened proposals and then posts the award
- Procurement coordinates a cost and price analysis of the award
- Procurement uses ADPICS to check if funds are available
- Procurement uses ADPICS to create a purchase order
- Procurement reviews and executes the contract

Mini-Contract

- The Department sends specifications of the good or services to at least five vendors
- The Department uses its criteria to determine the winner
- The Department prepares the contract
- The Department posts a public notice online and on the Office of Procurement bulletin board stating that a Mini-Contract is in effect
- The Department obtains Risk Management approval
- Procurement uses ADPICS to create a purchase order

- Procurement executes the contract (if applicable)

5.2.8 Results

After analyzing the Procurement Guide, we had the understanding of the entire process we had set out to achieve. Other than a few questions that focused on definitions and procurement terms, we had an understanding sufficient to create the process flowchart (See Appendix D) as well as to determine a set of criteria with which to choose solicitations for our case study. These questions were used for the interviews with the procurement manager and the criteria were presented to help him select solicitations for us.

5.3 Case Study

For further understanding of the process and the documents it involved, we performed an illustrative case study with two procurement instances. After reviewing all the procurement types, we decided that an IFB from a Competitive Sealed Bid contract and an RFP from a Competitive Sealed Proposal contract would be the best types of solicitation with which to conduct our case study. These two types of solicitation were the most complicated. All other, less complicated procurement types were subsets of these two complex ones, so by studying these two types, we were able to cover all the steps and documents in all nine procurement types without actually studying each type individually. Both solicitations were recently completed, and we were provided a folder for each of them that contained their finished RFP and IFB documents and a full revision history of each of the individual documents generated along the way. Communications exchanged between the procurement specialist and the using department were also present, primarily in the formats of memos or emails.

5.3.1 The RFP

The first procurement we looked at was a Competitive Sealed Proposal solicitation. For more information on this type of solicitation, see section 5.2.7. The solicitation was RFP #5504510055 for "professional cost estimating services," which is described in detail in Section C of the RFP for this solicitation. The procurement specialist for this solicitation was Michael Thomas, Senior Procurement Specialist and the contact in the using department was Anjali Gulati from the Department of Public Works and Transportation.

The initiating memorandum was sent by Bruce E. Johnston, from the Division of Capital Development in the Department of Public Works and Transportation to Beatrice Tignor, Director of the Office of Procurement. It was dated September 20, 2004, and indicated that the estimated value of the RFP would be $100,000 per contract per year term. It also indicated that the review process for this RFP would consist of both a review of the vendor's credentials and an interview with a representative of the vendor. The members of the Qualifications Selection Committee (QSC) would be Anjali Gulati, Hamid Omidvar, and Bill Novak. An initial RFP draft was included.

The RFP underwent many revisions, which were documented by a series of emails. Some changes made included changing the number of terms (in years) for which the contract could be renewed. The number was changed from an initial four terms to two possible terms of renewal. This change was made because a procurement regulation exists requiring special justification for renewal options beyond 2 terms.

The primary sections of the RFP that the using department is concerned with are Section C through Section E. Section C is titled Scope of Services. The work statement article under Section C states that "the consultant will provide the following services: Cost estimating for new

construction to include fixed and movable equipment, renovations, Heating Ventilation and Air Conditioning (HVAC) upgrades and remodeling projects, review of cost estimates prepared by other consultants and other services." The section also requires that the bidder should have a local office within 50 miles of the using department and lists all of the basic services they must provide at no additional cost as a contractual requirement (i.e. travel expenses, printing expenses, meals, electronic media, etc.). Two winning contracts will be awarded for this RFP, and the estimating service will be provided on a "task" basis. A task is an individual estimating job that could be completed by either of the contractors. Tasks valued under $5000 will be assigned on a rotating basis. For tasks valued above $5,000, both teams will submit proposals and the contractor who offers the best approach and value will be assigned the task. The last requirement of this section is that all estimates be prepared in a format that is compatible with IntelliCost, the software system used by the using department.

Section D specifies that the term of the contract will be for one year from the date the contract begins, and the Director of the Office of Procurement may choose to renew the term before the previous term ends a maximum of twice per contract. Additionally, terms and conditions for price adjustments are specified in this section.

Section E covers method of award and evaluation criteria. The procedure of selecting the awardees is described in detail, covering the decision process for the QSC, the requirement for the Director of the Office of Procurement for signing a contract, and the evaluation criteria.

The Attachments A through I were not of much interest to our group, as most of them were standard forms to be filled out by the bidding vendor. Attachment A was a reference sheet, requiring at least three references to be listed by the vendor. Attachment B was an optional form for the vendor to offer a contract extension (or bridge) to an existing contract with another

member government of the Metropolitan Washington Council of Governments. Attachment C was an option to indicate that the vendor is or is not a qualified MFD (Minority, Female, Disabled) firm. Attachment D was a form that shows a vendor's intent to fulfill MFD requirements unless specifically exempt. Attachment E was a guarantee form to be signed by the vendor guaranteeing their proposal amount and assuring that it will not affect any other existing contracts they hold with the County. Attachment F was an insertion of the insurance requirements form provided by Department of Risk Management. Attachment G was a form indicating that the vendor either met regulatory wage requirements or was exempt from such requirements. Attachment H was a supplement to the standard conditions of a contract that was unique to this particular RFP. Attachment I was a form for the vendor to indicate the hourly rates they would be charging for various team members to provide the estimating service.

At the end of our review of this RFP, the advertisement period was over and all bids had been received and placed in the solicitation file. The provided information from each bid had been organized into a folder area and forwarded to the using department for the QSC to review.

5.3.2 The IFB

The second procurement we looked at was a Competitive Sealed Bid solicitation. For more information on this type of solicitation, see section 5.2.6. The solicitation was IFB #5452000002 for "Modular Office Structure," and the procurement specialist for the solicitation was Pat Donnelly. The using department in this case was Montgomery County Fire and Rescue Service, and the initiating memo was dated September 30, 2004.

In the initiating memo, sent to the Director of the Office of Procurement from Richard Riff, Manager III of Fire and Rescue Services, the procurement is described as the "acquisition and installation of a 3-room modular office structure at the Urban Search and Rescue Building."

He wrote that the expected cost of the procurement was between $35,000 and $40,000, and that funds for the procurement have been received from a Federal Emergency Management Agency (FEMA) grant award, which has already been forwarded to the Office of Procurement.

The modular office structures were described in more detail in Section D of the IFB. Several draft versions of this section were present in the folder, along with emails detailing the evolution of it. It described exact specifications for the structures, such as position of windows, lighting type, and roofing type. Among the corrections made to the document was a change in the type of safety railing gate: it was clarified as being swinging, not either swinging or sliding. The section described all of the details of what was to be delivered and installed, down to the size of the individual offices and the thickness of the walls. This is necessary in an IFB because each bidder must know exactly what he or she is bidding on, as the award is determined solely on price.

The IFB had several attached forms, but none of them were very different from those already described in the RFP. The four included attachments, which were not specifically labeled, were equivalent to Attachments F, C, D, and G respectively from the RFP described in the last section.

At the end of our review of this solicitation, the advertising period for the solicitation had not yet begun. No bids had been received. The solicitation was scheduled to open for bids on December 6, 2004.

5.3.3 Description of Documents

From our review of the IFB and RFP used for our case study, we were able to identify nine unique documents which are involved in the solicitation process, not counting the IFB and RFP. Below are listed all nine of the documents and descriptions of each.

- **The Initiating Memo:** This is a memo, usually addressed to the Director of the Office of Procurement from the director of the using department, stating that the using department requires some item and they expect it to cost a certain amount. The procurement is usually described in general terms, and any special terms for the solicitation are usually justified here.
- **ADPICS Requisition Form:** This form is generated by the using department when they create an ADPICS requisition, and is typically attached to the initiating memo. It is required in order to ensure that funds for the procurement are available and allocated in the using department's budget.
- **Risk Management approval memo:** This is a memo from the Department of Risk Management that has an attached form indicating the determined insurance requirements that should be met by the vendor in order to be considered a qualifying bidder.
- **Bonding Requirements Form:** This form generated by the Department of Risk Management and is sent to the Office of Procurement attached to a memo. It is a form indicating what types of bonds should be required of bidding vendors to ensure contractual compliance.
- **MFD Artificial Barrier Form:** This form is filled out by an MFD procurement specialist indicating whether MFD requirements apply to the solicitation.
- **RFP Contract Selector Checklist:** This form indicates how the winning bid will be selected for an RFP. It has a summary area at the top of the form (RFP number, estimated value, description), a space to indicate the proposed awardee(s), a space to indicate the names of the Quality Selection Committee members, the method of award (Either by proposal rating, proposal rating and interview, or other), and the evaluation

criteria. It requires approval signatures from the procurement specialist, a senior procurement specialist, a manager, and the Director of the Office of Procurement.

- **IFB Routing Form:** This form is a "summary" of an IFB, which includes information like the IFB number, the procurement specialist who generated it, the using department contact, the opening date for bidding, information of the type of contract and its term, its estimated value, and any mandatory security requirements (bonds). It requires approval signatures from the procurement specialist, a senior procurement specialist, and the Director of the Office of Procurement.
- **RFP/REOI Approval Form:** Similar in purpose to the IFB Routing Form, this form begins with a summary of the RFP, including its description, date received, and estimated value. It then has a series of checklist items to ensure that every document and preparatory item is present in the solicitation. It requires approval signatures from the procurement specialist, a senior procurement specialist, a manager, and the Director of the Office of Procurement.
- **Solicitation Advertising Announcement:** This is a form that is filled out after the RFP or IFB is ready to be announced, indicating how it is to be advertised and made available.

In addition to these nine documents, there are the RFP and the IFB themselves. Both of these documents are generated largely from information listed in the first five of the other documents. The RFP Contract Selector Checklist is there to summarize how QSC (Qualification and Selection Committee) will be selecting the awardee or awardees and is not completed until after bids are received. The IFB Routing Form and the RFP/REOI Approval Form are checklists to be done after the IFB or RFP is completed and are designed to make sure everything needed

has been done and included in the solicitation folder. The Advertising Announcement is completed after approval is received so that the solicitation can be publicly advertised.

Both the RFP and IFB are created from boilerplates, which are available to each procurement specialist. The boilerplate is modified to include the specific information for this solicitation from the various required documents and formatted as necessary to accommodate the information. In the case of the RFP, the specifications of work and the contract selection criteria must be included. For an IFB, the exact specifications of the item(s) to be procured must be included. Various other standard blank forms are included for the bidders to fill out and return with their sealed bid or proposal. Once the boilerplate is filled out and all revisions are done to the satisfaction of the using department representative and the procurement specialist, the IFB Routing Form or RFP/REOI Approval Form is filled out, and the solicitation can be opened for bidding.

5.4 Interviews

Interviews were an important part of our research and added greatly to the accuracy of our results. We conducted interviews to answer questions we encountered during research, to obtain documents involved in the process, to verify our flowcharts and diagrams, and to learn what was expected of us concerning the performance metrics. Our interview candidates included a procurement manager, three procurement specialists, and two budget and management specialists. Each group provided us with different, but valuable, information for our project. This section details the results of those interviews.

5.4.1 Manager

The focus of our interview with the Procurement Specialist, John Lee, was to answer questions that we had encountered while researching the Procurement Guide. We also wanted to

ask Mr. Lee to obtain for us two solicitations for our case study and recommend procurement specialists for us to interview.

Sample questions and answers from the interview are outlined below:

Question: What is the difference between services and professional services (the difference between small purchases and mini-contracts)?

Answer: Professional services originally included doctors, lawyers, etc., but it has changed over the years and is now mostly a judgment call.

Question: Can there be bridge contracts with non-public entities?

Answer: It is possible to make bridge contracts with any vendor, but the original contract it is based on must be made by a public entity.

Question: "Procurement encumbers funds as required on an ADPICS purchase order" (Procurement Guide p.9) What does that mean?

Answer: Procurement freezes funds in the using department's budget in the amount specified in the ADPICS purchase order the using department created when it started the procurement request

At the end of the interview, when all of our questions had been answered, we asked Mr. Lee for the solicitations for our case study. He said there were two he felt would best fit our project and obtained them for us. In addition, after the interview he stated that he understood more about our project and was able to recommend three procurement specialists for us to interview: Pat Donnelly, Tammy Dixon, and Todd Collins.

5.4.2 Procurement Specialists

As recommended by the Procurement Manager, John Lee, we interviewed three procurement specialists. The goal of these interviews was to ensure that our process flowchart

and list of documents was correct. These interviews were conducted in the semi-structured style of interviewing.

Prior to our interview with Pat Donnelly, we had given her a copy of our process flowchart to go over. We requested that she look for content accuracy and fluidity. Pat Donnelly did just that and during our interview gave us her input. Ms. Donnelly felt that the flowchart was difficult to understand and was poorly formatted. It was difficult for her to follow the steps and therefore she was not able to understand our content order enough to analyze it. Because of this interview, we decided to drastically change the format of our flowchart. We made it easier to read and more user-friendly.

Our interview with Tammy Dixon was also semi-structured. When we conducted the interview, we showed Ms. Dixon our list of documents for each of the procurement types and asked her to assess them. She identified only one problem and felt there should be one addition. The problem was that we had the MFD barrier form as part of our list; she corrected us by pointing out that this form was dealt with in the stages after solicitation and not during the part of the process we were documenting. The additional document she told us to include was the CRC Routing Form. She said that the Contract Review Committee, in the case of a non-competitive purchase, would need to review the solicitation and therefore a form was required. Other than those two changes, Ms. Dixon felt that we had a full list and a full understanding of the documents involved in the solicitation phase of procurement.

In addition to going over our list, Ms. Dixon gave us a complete understanding of Emergency Procurement (For more details, see Appendix D). She also explained to us that the initiating memo has no standard requirements so the format varies greatly. Although each is different, they all need wording that is deemed acceptable by the Office of Procurement and the

County Attorney. She also gave us her opinion as to whether or not there should be a standardized initiating memo. She felt that would not be a good idea because each department's needs and the different types of procurements vary so greatly that problems would be inevitable.

The last interview we conducted was with Todd Collins. Mr. Collins was also asked to look at our list of documents and see if there were any changes that needed to be made. Mr. Collins went through each of the types of procurement with us and explained each document. He stated that there were no additions or changes that he could see except for adding a section to our initiating memo that asked for a list of vendors the using department would recommend as potential bidders. We made the change and created our final list.

With the input from Tammy Dixon and Todd Collins we were able to create a documents diagram that showed the details of all the documents in each type of procurement. The documents diagram (See Appendix C) also included a list of fields that each document contained. This documents diagram directly helped us create the XML documentation we needed. Pat Donnelly's interview lead us to completely reformat our process flowchart and make it more user friendly.

5.4.3 Budget and Management Specialist

We conducted the interview as described in the methodology section with Marsha Watkins Thomas, Budget and Management Specialist for the Office of Procurement. She provided us with a significant amount of information that contributed to our understanding of the performance metrics part of the project as well as a great deal of background on the BPMS.

The first topic Ms. Thomas discussed was the MARC (Maximum Agency Request Ceiling). Every year, the County assigns each department a MARC, which will be its budget for the upcoming year; the number is derived from previous budgets and projected tax revenues.

Departments may not exceed their MARCs, so it is important for the functioning of the department to be sure its MARC is high enough. A department may request that their MARC be raised if the County should set its budget too low, but if they do, they must have good reasons. The performance metrics this project produces could provide these reasons for the Office of Procurement. At the end of MARC assignments, there may be money left over that was not assigned to any departments. At this point, departments may make requests for extra "goodies" that they have wanted, but never have been able to afford. Last year, the Office put in one such request for a BPMS, and received a grant from the County to purchase one.

Ms. Thomas proceeded to elaborate on performance metrics. She explained that the metrics appear in the "Montgomery Measures Up!" publication every year. The metrics must be non-technical and easy for average citizens to understand and interpret. She also explained that we might not need to add, remove, or modify any existing performance metrics if we decide that the existing ones are sufficient.

We next discussed the BPMS. According to Ms. Thomas, the Office predicted that BPMS installation would reduce the average procurement cycle time from 180 days to 160 days. If the Office only implements a BPMS for the first phase, solicitation, that process could be reduced from 33 days to 26 days. These are significant improvements that the Office and many other departments throughout the County government are excited about. As for the actual installation, the RFP describing the BPMS is still a work in progress and its authoring is running behind schedule. Major decisions, such as what kind of hardware the BPMS software will run on and what features it must provide, are still being discussed.

5.4.4 Senior Budget and Management Specialist

We conducted the interview as described in the methodology section with John Greiner, Senior Budget and Management Specialist. From this interview, we learned a great deal about how we should proceed with the performance metrics portion of the project.

Mr. Greiner explained to us that he is hoping for two different classes of performance metrics to result from our project. The first class will be for "Montgomery Measures Up!" These metrics are the ones we previously discussed with Ms. Thomas. Again, he stressed that these measures must be clear, concise, and easy to interpret. The second class consists of measures for internal use only. These metrics may be politically controversial, too complicated for quick and easy evaluation, or not appropriate due to some other reason for the "Montgomery Measures Up!" publication.

Mr. Greiner explained what the goal behind all metrics should be, and how we should formulate them. He stated that we should be looking at the solicitation process, ways of measuring the effectiveness of that process, and how well it is proceeding; we should keep in mind that it is a matter of looking at the actors involved as well as the processes involved. We should also concentrate on what makes a successful procurement. He suggested a few potential ways of measuring success, such as timeliness and cost. The flowchart we created, he continued, is also a good source of ideas for metrics, as we can see frequently repeated processes and predict bottlenecks. He stressed that he wanted us to look specifically at solicitation service quality, efficiency, and workload.

Another suggestion was to try non-concrete metrics, such as subjective questions on a one to ten scale. For example, he proposed asking using departments to rate their experience with the Office on a scale of one to ten, one being unsatisfactory, ten being very positive. We

questioned him regarding the usefulness and validity of data gathered this way, to which he replied that he believed it would be useful, but he was not entirely sure.

We asked him if he would like us to gather data, when possible, about the performance metrics that we suggest. Essentially, we wanted to know if we should simply suggest metrics, or if we need to provide numbers for past years when possible for our metrics to prove that they are useful and valid. Mr. Greiner replied that we do not need to show any numbers, as many others will evaluate the metrics we provide before they are implemented and some may not be implemented until after the full BPMS is set up possibly years in the future.

5.5 Products

Together, the Procurement Guide research, case study, and interviews provided us with sufficient information to finalize the three results of our project. The flowchart and documents diagram, XML, and performance metrics are described in the following sections.

5.5.1 Flowchart and Documents Diagram

As explained section 4.4, the process flowchart and the documents diagram were an ongoing part of our project. The process flowchart provides a quick and easy way of understanding the procurement process. By tracing a series of arrows, following directions prescribed by boxes, and making the decisions indicated in the diamonds, someone could rapidly gain an understanding of how the procurement process works. The documents diagram provides a reference, including all documents and all fields within them, for each type of solicitation. Procurement specialists, managers, and others can use this diagram as a checklist. The BPMS vendor will also be interested in this diagram, as it outlines what paperwork must be made into electronic copies, and provides them with another perspective on the XML schemas.

The process flowchart and the documents diagram can be found in Appendices D and E, respectively. For the process flowchart, we decided to go beyond just solicitation and describe the procurement process up to contract execution as we felt it would be beneficial to the Office of Procurement.

5.5.2 XML

Following the procedure detailed in section 4.5, we created a series of XML schemas for the documents involved in the procurement process. All documents involved in RFP's, IFB's, and their subsets (such as mini-contracts, open solicitations, and bridge contracting) were broken down and described in this computer-interpretable, as well as human-comprehendible, form. In addition, we created an audit log to be used in the future by the BPMS to track changes, approvals, rejections, and other actions done on the documents.

For example, a procurement specialist may have to create a new solicitation. Using the process flowchart, he can determine that he needs to make an IFB, also known as a competitive sealed bid. Using the BPMS, he can create a series of XML files, starting with a solicitation file of type competitive sealed bid, describing all the documents he would previously have had to complete. In the background, the audit log tracks his progress, and when the solicitation goes out for the approval of a manager or other authority, the log keeps track of that as well. Finally, the solicitation is completed.

In order for this ideal situation to occur schemas of all documents are needed. We used the computer program, XMLSpy, to create these XML schemas. Copies of all XML schemas, in diagram and textual forms, can be found in Appendix F.

5.5.3 Performance Metrics

In accordance with our methodology, we created a series of performance metrics for the Office of Procurement. We classified the measures into two groups: overall procurement process measures, and solicitation and award process measures. Overall procurement process metrics include ways to analyze the entire procurement process, such as "average using department satisfaction of the procurement process" and, "total complaints received about the procurement process." Solicitation and award process measures focus on that particular part of the procurement process, concentrating on more specific methods than the overall procurement process measures. Such measures include "average time to complete MFD compliance process" and "percentage of solicitations that need to be redone."

Each measure also includes a method, describing how to gather the data, and a rationale, describing why we chose this metric and find it important. Furthermore, we believe that most metrics can be published in the "Montgomery Measures Up!" document, and therefore we have created sample pages for this document containing our measures. For a complete listing of the metrics, and the "Montgomery Measures Up!" sample pages, see Appendix G.

6 Conclusion

The goal of our project was to document the solicitation process in both human and computer interpretable forms and to recommend performance metrics to the Office of Procurement in Montgomery County, Maryland. To achieve our goal, several social science and computer science research methods were used.

1. Research of the Montgomery County Procurement Guide
2. An illustrative case study of two types of solicitations
    - Invitation for Bid
    - Request for Proposal
3. Interviews with Office of Procurement employees
    - Manager
    - Procurement specialists
    - Budget and management specialists
4. Flowcharting and diagramming
5. XML research and schema creation

From this research we gained a complete understanding of the procurement process in Montgomery County, MD; more specifically, the solicitation process. This understanding allowed us to create physical results that were presented to the Office of Procurement at the end of our project.

1. A flowchart and documents diagram of the complete procurement process, covering the documents and decisions starting from when a need for a good or services arises to when a contract is signed with a vendor.
2. XML schemas for all documents used in the solicitation process

3. A list and descriptions of performance metrics to gauge performance over time

We hope the Office of Procurement will use our results to improve as well as add to their process. We recommend the process flowchart be used as a tool for new employees who are learning the process or as an appendix to the current Procurement Guide. We anticipate that the Office of Procurement will use our XML schemas in their future implementation of a business process management system. Lastly, we expect that by using our performance metrics, the Office of Procurement will be able to find and assess any problems they have in the solicitation process and make changes to improve.

7 Recommendations

The following chapter presents our recommendations to the Montgomery County Office of Procurement on how to use the items our team produced over the course of our project.

7.1 Process Flowchart

1. Use the process flowchart to help train new employees.

Training a new procurement specialist is not a simple task. According to manager John Lee, it takes a year and half on average for a new employee to become familiar with the procurement process. Current methods of training could be augmented with the presentation of the process flowchart to better demonstrate the order of events in the solicitation process. This could lead to better general understanding by new staff, or decreased training time, or both.

2. Include the process flowchart as part of future version of the Procurement Guide.

Since the Procurement Guide is designed as a way of describing how the procurement process works, and since our flowchart was designed primarily based on information gathered from reading the Procurement Guide, inserting portions of the process flowchart could make the Guide more readable in future versions. The Guide currently exists entirely in text form. The addition of flowcharts to the Guide could make it much easier for using departments to understand their responsibilities when interacting with the Office in the future.

7.2 Use of XML

3. Use schemas to standardize communications between departments

Microsoft Office 2003 has the ability to create documents that validate against XML schemas. If departments are able to create schemas for documents that travel between

departments, they can use the schema to ensure that any document they receive in response is in the proper format. For example, if a schema is designed for a memo, the memo can be ensured to have all of the proper fields when it is written and Word can enforce the format so that improper memos are not sent. This would also apply to more complex documents, such as Insurance Requirements documents from the Department of Risk Management or the MFD Artificial Barrier Form from the Office of Procurement.

4. **Correct the issue of circular reference (see section E.3)**

   In section E.3, a flaw is discussed regarding the file include method with the XML schemas. This should be addressed and resolved with a solution that does not require the document schema to include the schemas for every other type of document. The current model creates a circular include problem: each schema that extends Document includes the schema for Document, but then the schema with root element of Document must include the schema for every type which extends Document (which all include Document). Additionally, it should not be necessary to update the document schema whenever a new type which extends Document is created. See Appendix E for more details on this issue.

5. **Continue development of XML to include a wider range of schemas**

   Although the schemas we have created are complete and functional, they are in no way all the schemas that the Office of Procurement might need. More development may be necessary in the future to create additional schemas or to modify some of ours. XML can change as the needs of the users change and the schemas should be updated as necessary.

6. **Use schemas for implementation of a business process management system (BPMS)**

Many business process management systems are designed with configurability in mind. The XML schemas we have created can be used to describe the format of various documents that the BPMS will need to accept and process. Actors and other entities will also be described to the system in XML, and the schemas we have designed should help shorten the overall implementation time for the system.

7.3 Performance Metrics

7. Use internal, non-published metrics to track department performance

In addition to the public metrics published in the "Montgomery Measures Up!" document, the Office of Procurement should select a number of other measures that can be used internally to track their performance. We have created a list of potential metrics they could use which would help show where time is being spent the most, where time spent varies largely, and what documents (if any) are causing delays in their process.

8. Use external, published metrics to allow external performance monitoring

Some of the metrics detailed in this project could be included in future editions of the "Montgomery Measures Up!" document allowing external entities, including County citizens and departments, to track the performance of the Office of Procurement.

9. Maintain an XML Audit Log to track events in the solicitation process

- Many of the metrics we have recommended could be automatically measured when their BPMS system is implemented. The system will track document events and process events, and will be able to calculate many metrics on command. Until that system is in place, we have created a type of *audit log* in XML that can be used to manually calculate some or all of these metrics if the audit log is maintained for each solicitation.

- Failure to properly log events in this log may result in inaccurate or incomplete metric calculations later. We have not designed a way to automatically update this log as events occurred; this was outside the scope of our project. In addition, deleted or otherwise lost logs will result in incomplete measures.

10. Find a way to rate the difficulty of a solicitation

Some of the recommended metrics may be misleading when the difficulty of the involved solicitations is not taken into account. For example, the number of solicitations might decrease from one year to the next, which may lead to the conclusion that the workload from solicitations has also decreased. This conclusion may be inaccurate, however, if the difficulty of the solicitations has increased.

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Appendix A About the Sponsor

Montgomery County is the largest, most affluent county in Maryland. It has the greatest land area, at 507 square miles, and the largest population, at 855,000 (Department of Housing and Community Affairs, 2001, pp. 1-7). The average income per capita is $50,000, more than any other Maryland county. According to the Montgomery County website (2004, "Government"), the mission of the county government is as follows:

> The mission of the Montgomery County Government is to provide for the peace, good government, health, safety, and welfare of the County in accordance with, and under authority of, the Constitution and laws of Maryland, and the Montgomery County Charter. To accomplish this mission, the Montgomery County Government provides: public laws and oversight through the County Council and the offices and boards of the Legislative Branch; the administration of judicial offices; and public programs, services, and infrastructure through the County Executive and departments, offices, boards, and commissions within the Executive Branch.

The Montgomery County government consists of three branches: legislative, judicial, and executive (Montgomery County, 2004, "Government"). It had an operating budget of $1.1 billion dollars in fiscal year 2004. The Office of Procurement is a part of the executive branch. It had an approved operating budget of approximately $2.4 million dollar for fiscal year 2004, and it employed twenty-eight full time workers and one part time worker, for 28.4 working years per year (Montgomery County Office of Procurement, 2004, "Budget"). For fiscal year 2005, 2 additional employees have been hired, and their budget has been increased by 10.6% to approximately $2.65 million dollars (Office of Procurement, 2004). The policies and regulations

of the Office of Procurement are set by the County Council, and must conform to various existing state and federal regulations. When a new procurement regulation is approved by the County Council, an updated Procurement Regulations document is written to reflect the change.

The Office of Procurement oversees a purchasing process that assures impartial and equitable evaluation of bids and proposals from vendors and helps agencies to establish fair and reasonable contracts. In the event of a contract dispute or claim resolution, the Office acts as mediator. The Office of Procurement's mission is stated best by their website (2004, "Office of Procurement"):

> The role of the Office of Procurement is to assist departments and agencies in acquiring goods, services, or construction. It is, in most cases, the place of initial contact for both agencies and contractors to acquire goods or services.
>
> In general terms, the objectives of the Office of Procurement are:
>
> 1. To obtain the right products or services (meeting quality requirements)
> 2. In the right quantity;
> 3. For delivery at the right time to the right place;
> 4. From the right source (a responsive and reliable supplier);
> 5. At the right price.

Our project goal was to document the solicitation process in both human readable and computer-interpretable forms and make recommendations for performance metrics. Creating human readable documentation, essentially our process flowchart, for the Office of Procurement provided them with a simple, easy to follow outline of their procurement process. It is also a tool they can use to train new employees or use as an addition to their Procurement Guide. The computer-interpretable documentation, in the form of XML, will be used by the Office of

Procurement in the future implementation of their business process management system. The XML will be used by the BPMS to standardize document formats and formulate document templates. The last part of our goal, to recommend performance metrics, will allow the Office of Procurement to asses their process and be able to identify any problems that may exist. By knowing what the problems are, they will be able to make changes in their process allowing solicitation to occur more smoothly.

The goal of the Office of Procurement (as listed above) is to obtain the right products or services in the right quantity; for delivery at the right time to the right place; from the right source; at the right price. By completing our project, we were able to give the Office of Procurement XML documentation that would be implemented in a business process management system that will allow the Office to function in a more organized, streamlined, and consistent way. The performance metrics we recommended will give the Office ways to measure this progress and quickly assess and identify any steps that need to be changed.

Below is an employee organizational chart that outlines the departments and employees in then Office of Procurement. We feel that each employee will be impacted by our project in one way or another. For example, the operations department will have a better way of conducting their day-to-day tasks with the implementation of the business process management system that will include our XML documentation and the administration will have a way of measuring performance using our recommended metrics.

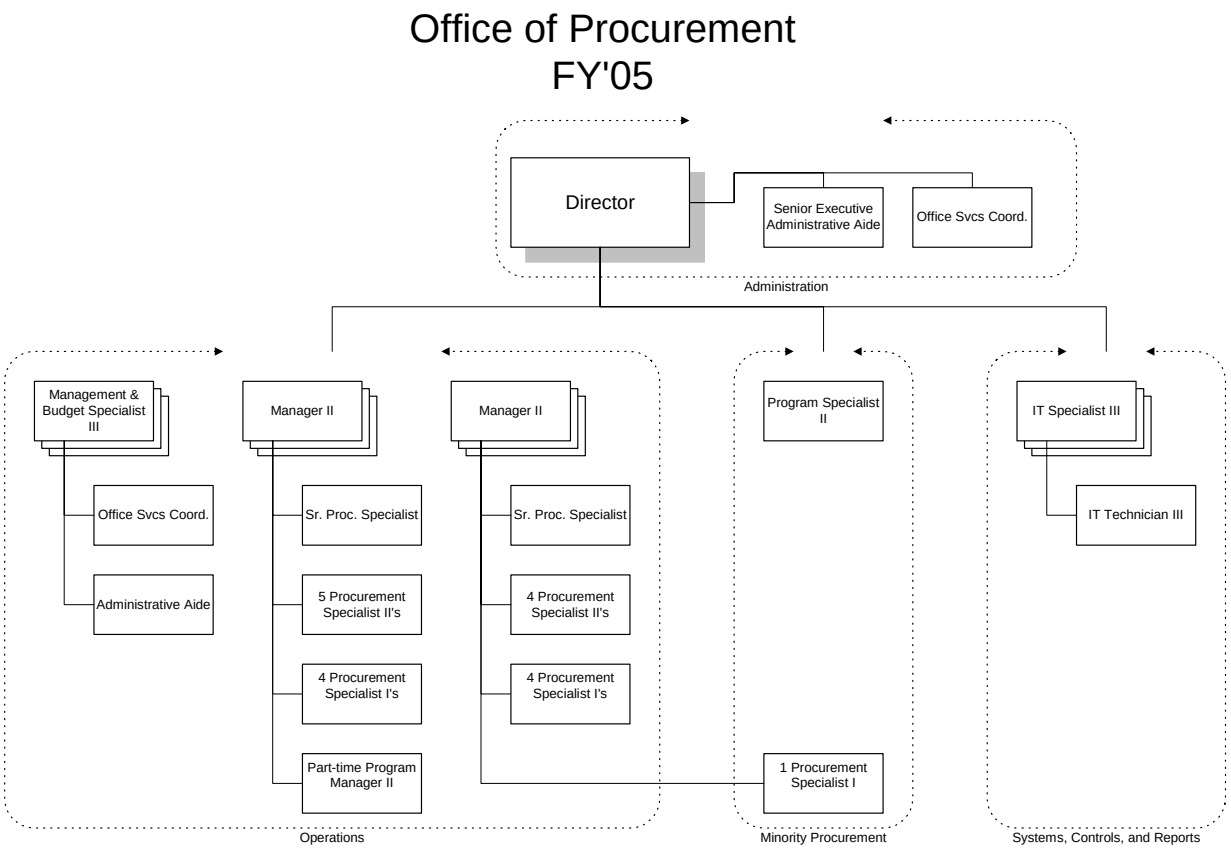


Figure A.1: Office of Procurement FY05 Organizational Chart

Our project will not only affect the Office of Procurement employees but will create a better Procurement Office which will be able to communicate more effectively with other county departments and therefore give the citizens of Montgomery County an effective and responsive government.

Appendix B Initial Project Description

This section contains a copy of the document titled “Documenting the Solicitation Process Using XML in Montgomery County’s Office of Procurement.”

DOCUMENTING THE SOLICITATION PROCESS USING XML IN MONTGOMERY COUNTY'S OFFICE OF PROCUREMENT

BACKGROUND

During Fiscal Year 2003, Montgomery County, Maryland's Office of Procurement purchased $583 million worth of goods and services on behalf of County agencies. During that period, about 230 formal solicitations were issued, and more than $310 million was spent under contracts stemming from these and past solicitations. In April 2004, the Montgomery County Council approved the acquisition and implementation of a Business Process Management System (BPMS) designed to increase the efficiency of the Office of Procurement, provide management with real-time information on business activity, and improve the delivery of information to stakeholders inside and outside of County government.

PROJECT DESCRIPTION

An essential step in deploying the BPMS will be the development of a detailed description of the Office of Procurement's business processes. The proposed WPI project will involve describing a key part of the procurement process – the solicitation process – in a manner such that the resulting documentation can be readily incorporated into and used by the Business Process Management System. XML (Extensible Markup Language – a meta-language for describing information) will be employed to make that description open and flexible.

Because of the complexity of the BPMS (which will be implemented over a period of four years), the initial focus will be on the *solicitation development process*, which constitutes a major activity of the Office of Procurement in terms of the time and dollars involved. The solicitation process begins when the Office of Procurement receives a memorandum from a department describing a need goods or services (and indicating the availability of funds to pay for them). It continues with the development and issuance of an appropriate Request for Proposal (RFP) or Invitation for Bid (IFB) and ends with the opening of the bids received.

The WPI student team will be responsible for developing, in consultation and collaboration with the Office of Procurement, a set of XML descriptions characterizing all documents, processes, and agents involved in the solicitation process (see Appendix 1 for a short description of XML). The project team is not expected to produce a model of the solicitation process; its primary purpose will be to document the process as it exists.

The project team will first develop a description/documentation methodology (a vocabulary and grammar based on XML). It will then produce a list of XML descriptions and their "schemas" (see Appendix 1) characterizing all aspects of the solicitation process, including the documents, workflows, and agents/actors involved. Finally, the team will identify and define appropriate performance measures to monitor, manage, and evaluate the solicitation process.

1. Orientation. With the help of Procurement Office staff, the team will become familiar with the Procurement Office's solicitation process and with XML.

2. Description/Documentation Methodology. The team will determine a naming convention that will apply to all objects involved in describing the solicitation process. The relationships between the relevant XML descriptions will be analyzed to develop general categories such as workflows and processes, actions, documents, messages, organizations, agents, and actors. In addition, certain basic terms and distinctions will be defined (e.g., process vs. action; document vs. message).

3. XML Descriptions and Schemas. The team will identify all objects involved in the solicitation process and organize them into the categories defined in step 2. At the same time, the content and structure of these objects will be described using XML. The raw XML information (descriptions and schemas) will be presented in the form of worksheets and graphs in order to be of use to a variety of individuals (see Appendix 2).

4. Performance Measures. Using the XML descriptions developed in step 3, the team will review the solicitation process to identify appropriate measures for characterizing that process: workload measures, efficiency measures, service quality measures (response times, accuracy), etc.

5. Final Report and Products. The team will prepare a report on the definitions and conventions it develops, its findings, and its recommendations (e.g. on information that should – or should not – be captured as part of the solicitation process). This report, plus the XML descriptions and schemas characterizing the solicitation process, will constitute the major products of the project.

RESOURCES

The Office of Procurement will put two workstations at the team's disposal and will provide workspace in a conference room for the duration of the project. Video projection equipment and conference phones will be available. The Office's IT Specialist will provide guidance in all aspects of XML technology, while other procurement staff will be available to discuss and describe the Office's business processes.

The Office of Procurement is located in Rockville, Maryland (a suburb of Washington, DC) and is adjacent to a covered walkway that goes to the Rockville Metro stop, allowing easy access to and from the District of Columbia.

APPENDIX 1 - A BRIEF INTRODUCTION TO XML

XML – eXtensible Markup Language – is a metalanguage for describing information. XML is similar to HTML in the sense that it is based on tags. However, it differs from HTML in that it allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations. As in HTML, XML tags can contain text as well as other tags and can have attributes. When the tags of an XML description are properly nested, the description is said to be well-formed. The information an XML description can or must contain can be described in a schema. When an XML description conforms to its schema, it is said to be valid.

Listing 1 presents an XML description that represents a street address. The root of the description is the <address> tag (also called a node); it has a *country* attribute. The root lists a number of child nodes, one of them, the <postalCode> tag, having an attribute as well. The description is clearly readable by humans. Additionally, it is structured in such a way that it can easily be parsed and manipulated by software.

```
<?xml version="1.0" encoding="UTF-8"?>
<address
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:noNamespaceSchemaLocation="address.xsd"

    country="USA"
>
    <street>255 Rockville Pike</street>
    <street>Suite 180</street>
    <city>Rockville</city>
    <region>MD</region>
    <postalCode format="US-5">20850</postalCode>
</address>
```

Listing 1: an XML description. It is valid against address.xsd.

The address description is associated with a schema (Listing 2). Even though the schema is less readable than its corresponding address description, it is clear from the schema that the <address> tag must contain a *country* attribute for the XML description to be valid. The schema indicates that the <address> tag is a sequence of any number of children <street> tags, followed by one <city>, <region>, and <postalCode> tag. It also states that the <postalCode> tag can contain a *format* attribute.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified">
```

```
    <xs:element name="address">
        <xs:complexType>
            <xs:sequence>
                <xs:element ref="street" maxOccurs="unbounded"/>
                <xs:element ref="city"/>
                <xs:element ref="region"/>
                <xs:element ref="postalCode"/>
            </xs:sequence>
            <xs:attribute name="country" type="xs:string" use="required"/>
        </xs:complexType>
    </xs:element>
    <xs:element name="street" type="xs:string"/>
    <xs:element name="city" type="xs:string"/>
        <xs:element name="postalCode">
        <xs:complexType>
            <xs:simpleContent>
                <xs:extension base="xs:string">
                    <xs:attribute name="format" type="xs:string"/>
                </xs:extension>
            </xs:simpleContent>
        </xs:complexType>
    </xs:element>
    <xs:element name="region" type="xs:string"/>
</xs:schema>
```

Listing 2: an XML schema.

A schema can serve various purposes. One of them is to validate XML descriptions. Validation guarantees, within limits, that a given description will be properly processed. In essence, a schema is an agreement between the creator of the description and some other party or system; it is a statement of compliance to some given structure.

Another use of schemas is in document creation. When a user sets out to write an XML document declared to comply with a given schema, software can read the schema and prompt the user for the content of the specified nodes. If the schema limits the value of an attribute to some predefined list, it will offer only those choices to the user. If a node is required, schema-aware software will prompt the author for it. In short, a schema can serve as a template for authoring documents.

APPENDIX 2 – EXAMPLE OF A GRAPH AND A WORKSHEET

XML schemas and documents can be represented in various ways – for instance, graphically (e.g. as trees) or as worksheets. Each type of representation emphasizes different types of information and can be appropriate for different types of users.

```
<xs:sequence>
   <xs:element name="description"/>
   <xs:element name="actors">
      <xs:complexType>
         <xs:sequence>
            <xs:element name="actor" minOccurs="0" maxOccurs="unbounded"/>
         </xs:sequence>
      </xs:complexType>
   </xs:element>
…
```

Listing 1: Fragment of a possible process schema.

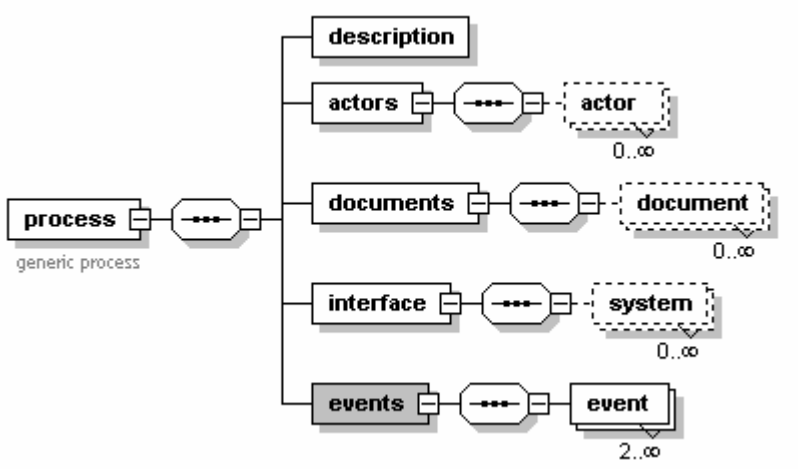


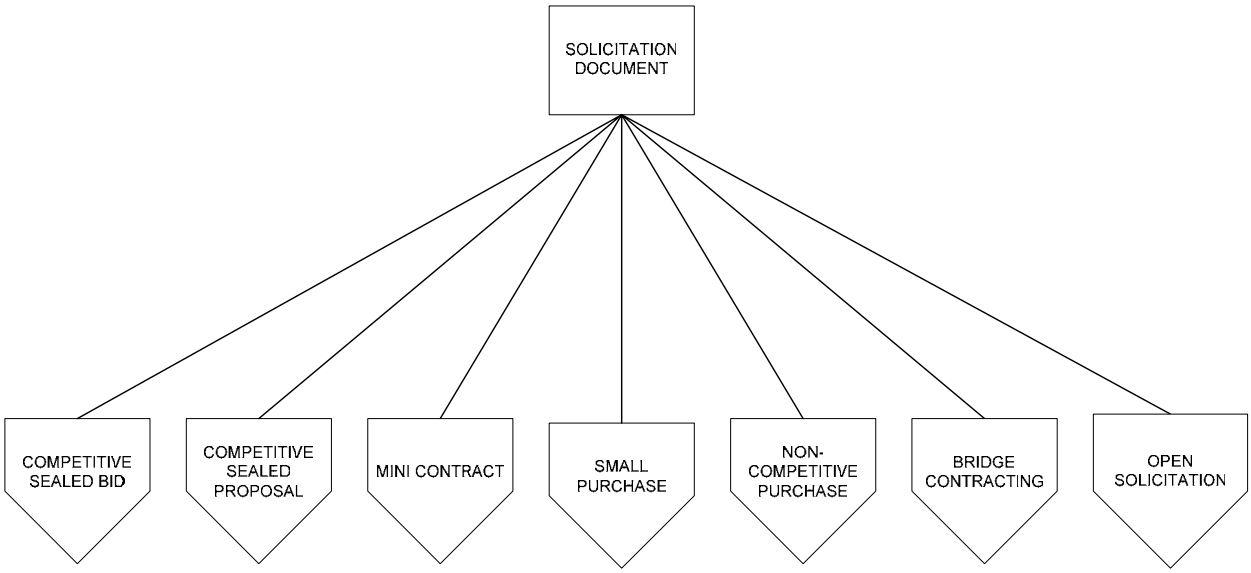
Figure 1: A graphic representation (a tree) for a possible process schema.

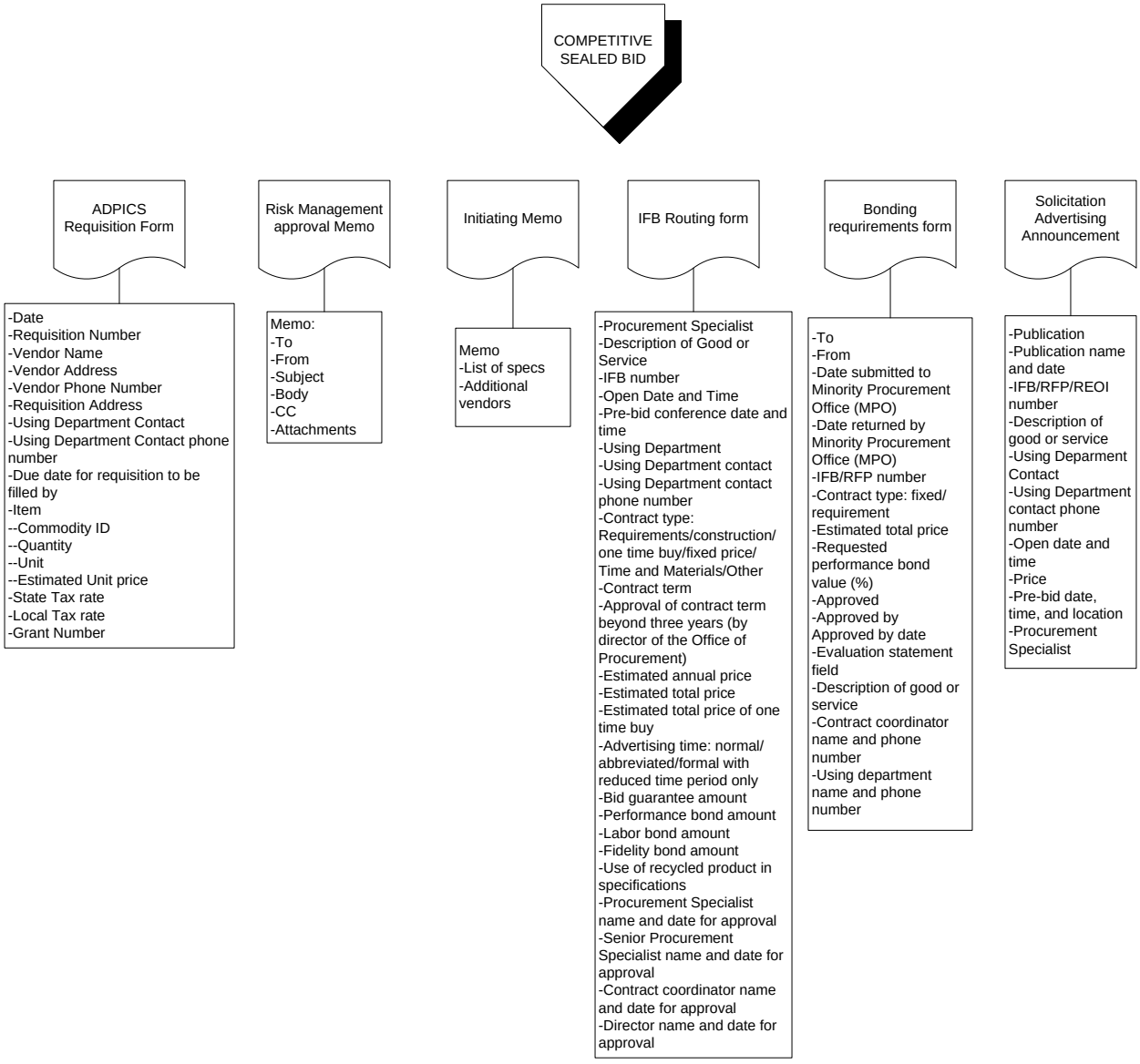
Worksheet	procure.coreProcess.competitiveSealedProposal
Name	Competitive sealed proposal
Description	Formal solicitation for goods, services, or construction through public notice where factors other than, but not excluding, cost are used in determining award
Actors	• Requesting department • Qualification and selection committee (QSC) • Office of Procurement • Proposing Vendors • Selected Vendor

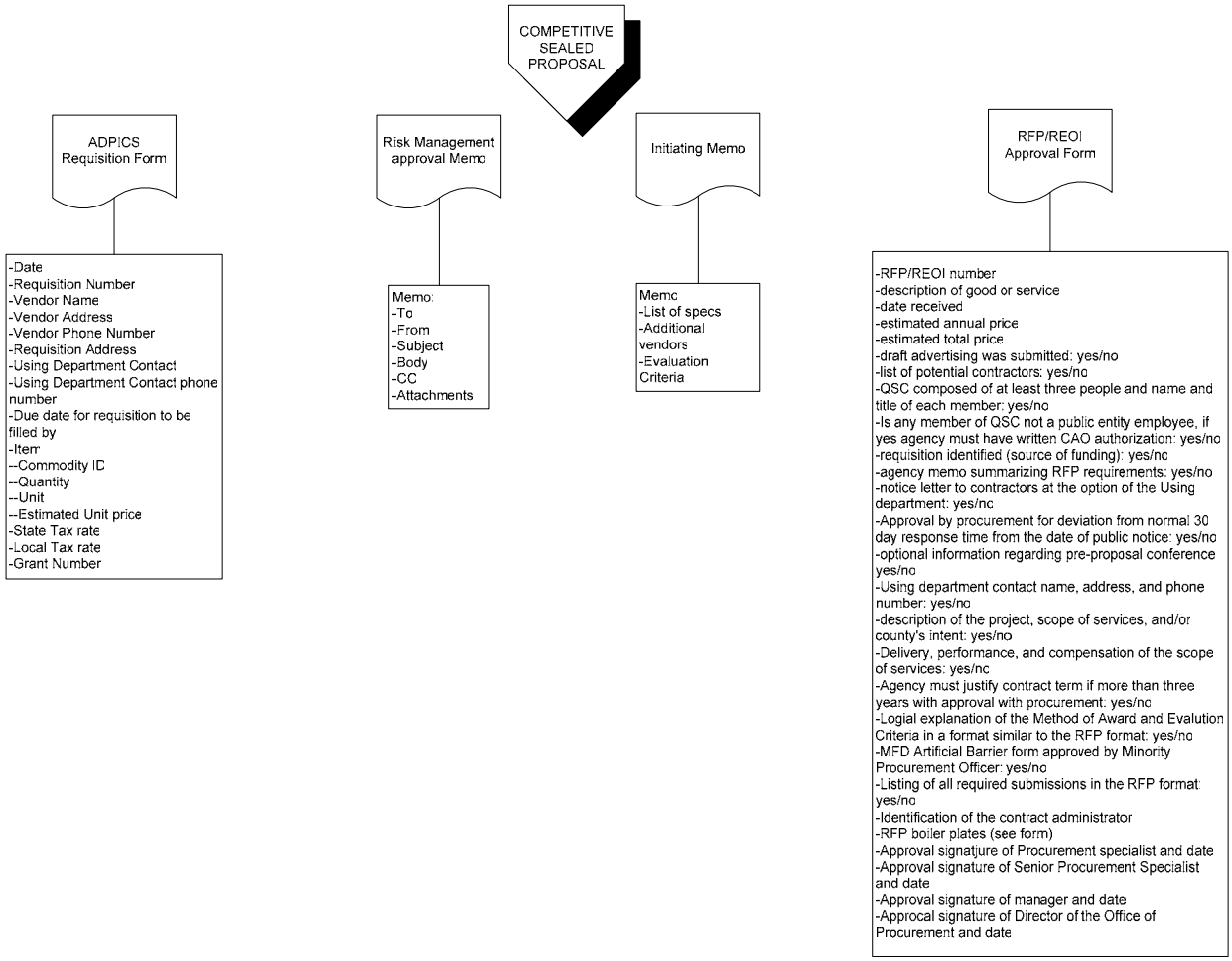
Documents	• Departmental memorandum (procure.document.departmentalMemorandum) • Solicitation (procure.document.RFP) • Amendment (procure.document.solicitationAmendment) • Contract (procure.document.contract)
Interface	• ADPICS (procure.system.mainframe.ADPICS) • Local database (procure.document.) • Amendment (procure.document.solicitationAmendment)
Events	

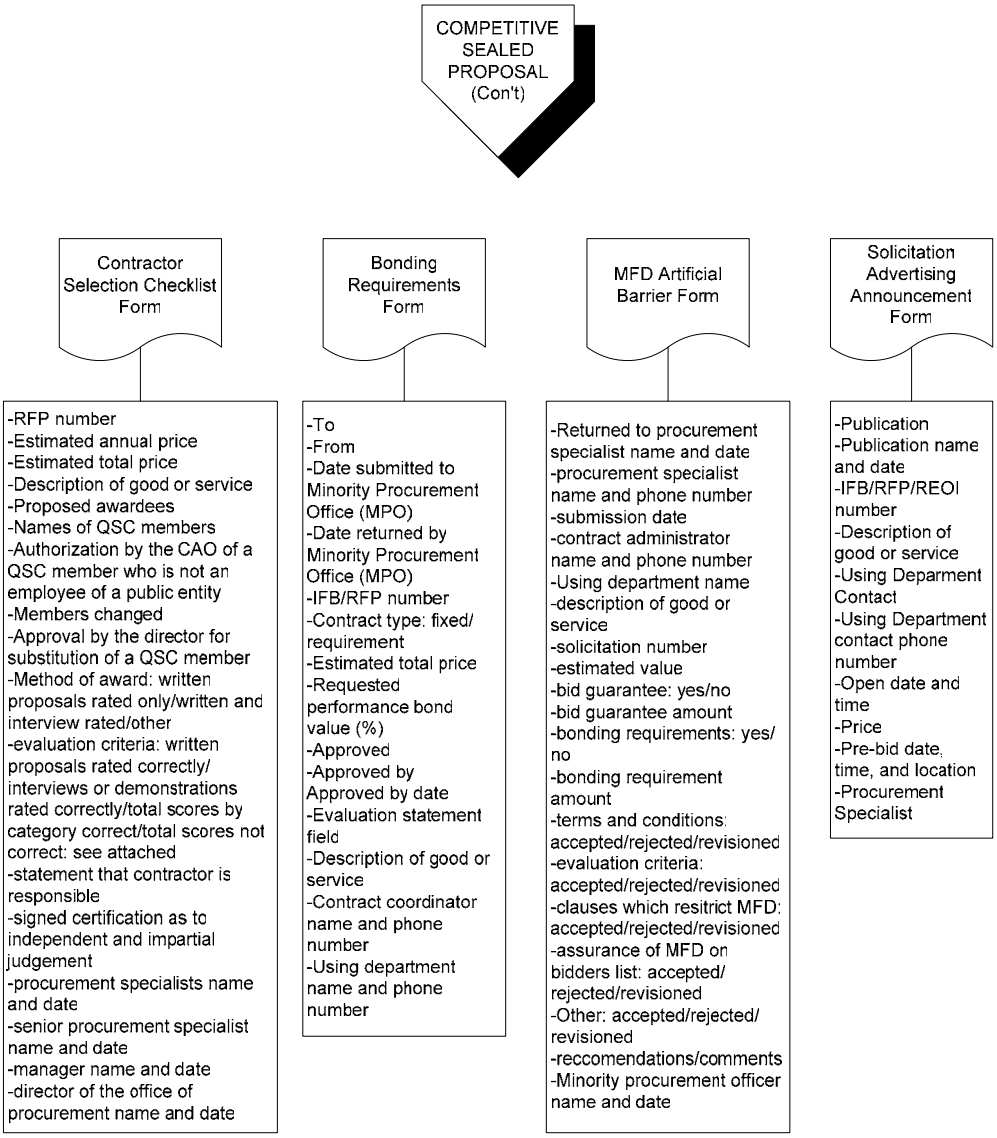
Figure 2: A high-level process worksheet.

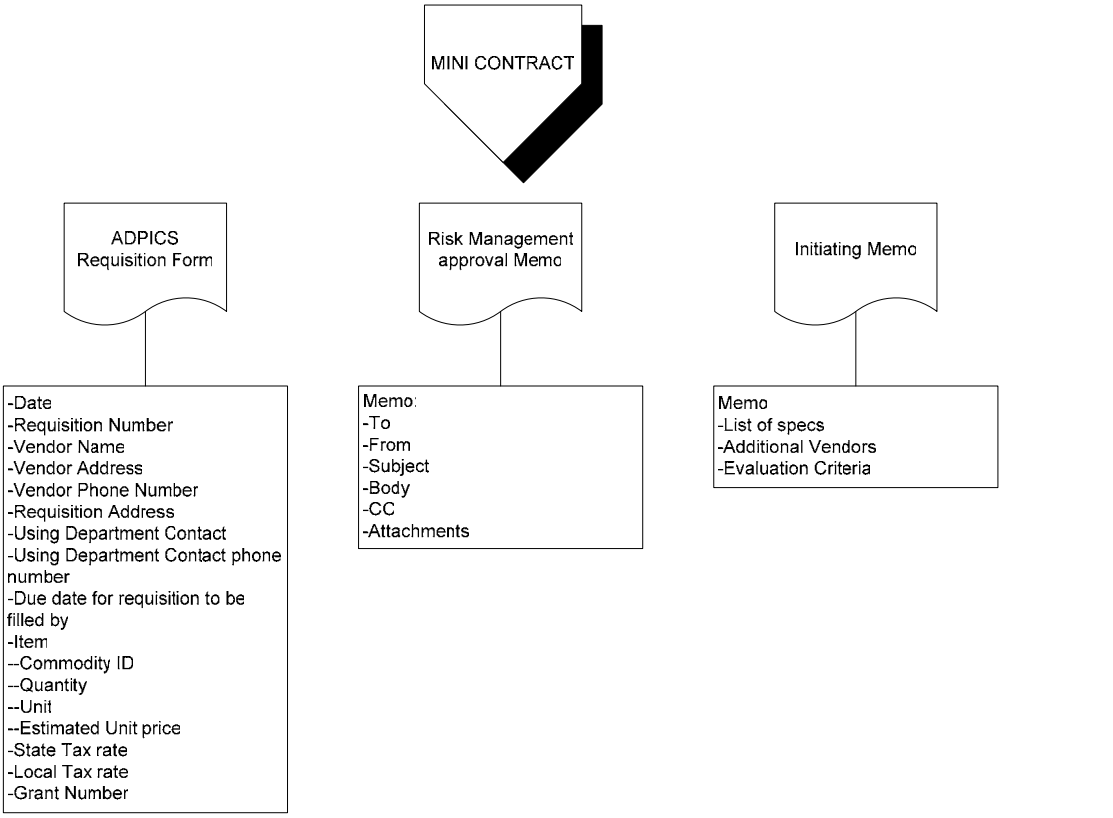
Appendix C Documents Diagram

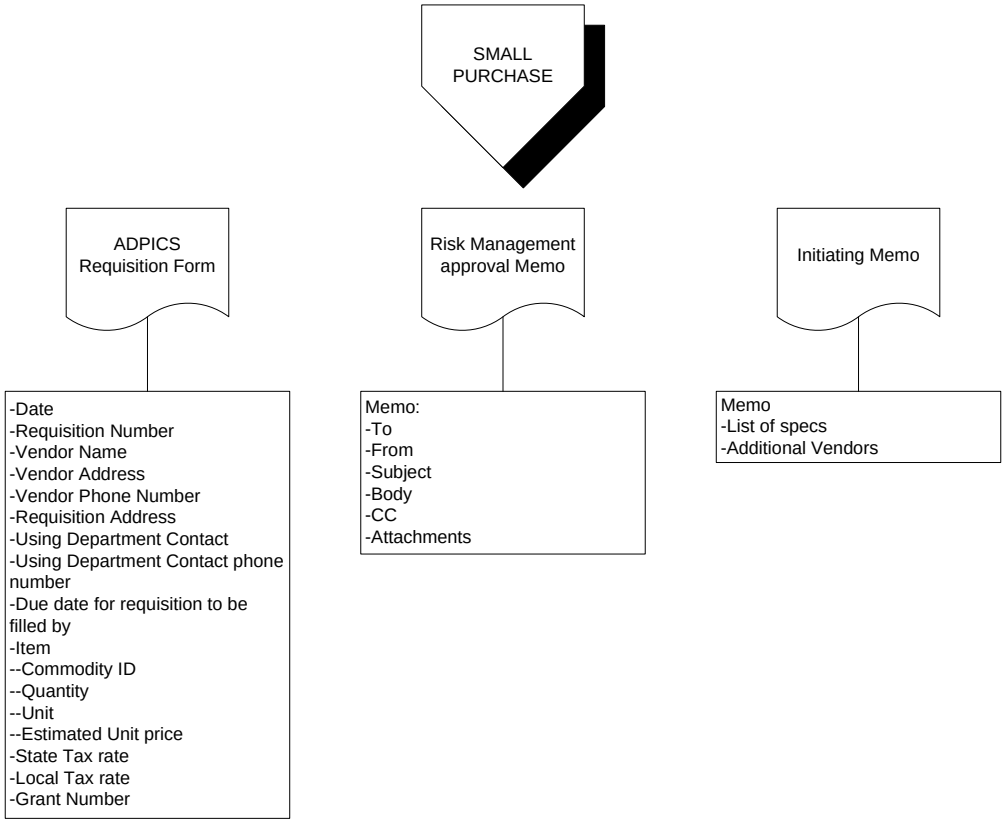


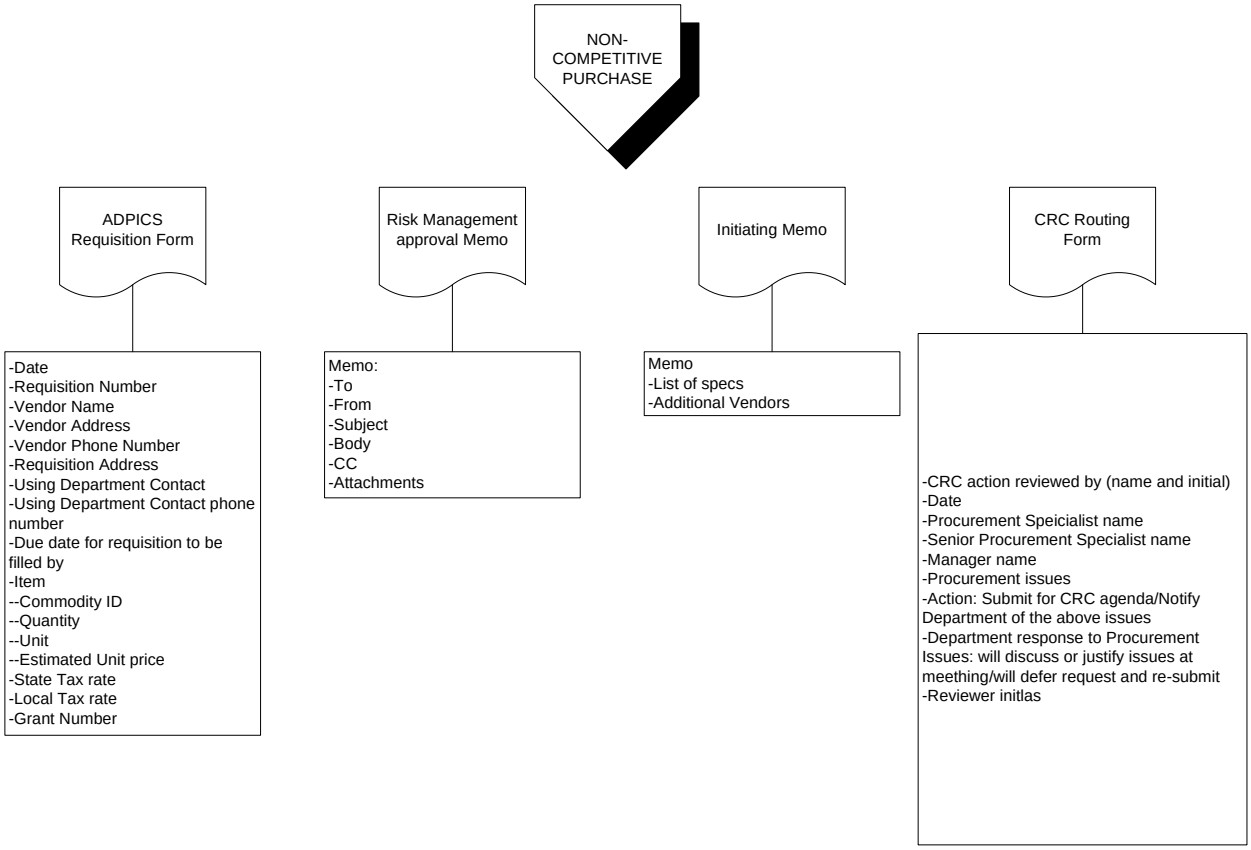

COMPETITIVE SEALED BID
ADPICS Requisition Form
-Date
-Requisition Number
-Vendor Name
-Vendor Address
-Vendor Phone Number
-Requisition Address
-Using Department Contact
-Using Department Contact phone number
-Due date for requisition to be filled by
-Item
--Commodity ID
--Quantity
--Unit
--Estimated Unit price
-State Tax rate
-Local Tax rate
-Grant Number
Risk Management approval Memo
Memo:
-To
-From
-Subject
-Body
-CC
-Attachments
Initiating Memo
Memo
-List of specs
-Additional vendors
IFB Routing form
-Procurement Specialist
-Description of Good or Service
-IFB number
-Open Date and Time
-Pre-bid conference date and time
-Using Department
-Using Department contact
-Using Department contact phone number
-Contract type: Requirements/construction/ one time buy/fixed price/ Time and Materials/Other
-Contract term
-Approval of contract term beyond three years (by director of the Office of Procurement)
-Estimated annual price
-Estimated total price
-Estimated total price of one time buy
-Advertising time: normal/ abbreviated/formal with reduced time period only
-Bid guarantee amount
-Performance bond amount
-Labor bond amount
-Fidelity bond amount
-Use of recycled product in specifications
-Procurement Specialist name and date for approval
-Senior Procurement Specialist name and date for approval
-Contract coordinator name and date for approval
-Director name and date for approval
Bonding requrirements form
-To
-From
-Date submitted to Minority Procurement Office (MPO)
-Date returned by Minority Procurement Office (MPO)
-IFB/RFP number
-Contract type: fixed/ requirement
-Estimated total price
-Requested performance bond value (%)
-Approved
-Approved by Approved by date
-Evaluation statement field
-Description of good or service
-Contract coordinator name and phone number
-Using department name and phone number
Solicitation Advertising Announcement
-Publication
-Publication name and date
-IFB/RFP/REOI number
-Description of good or service
-Using Deparment Contact
-Using Department contact phone number
-Open date and time
-Price
-Pre-bid date, time, and location
-Procurement Specialist

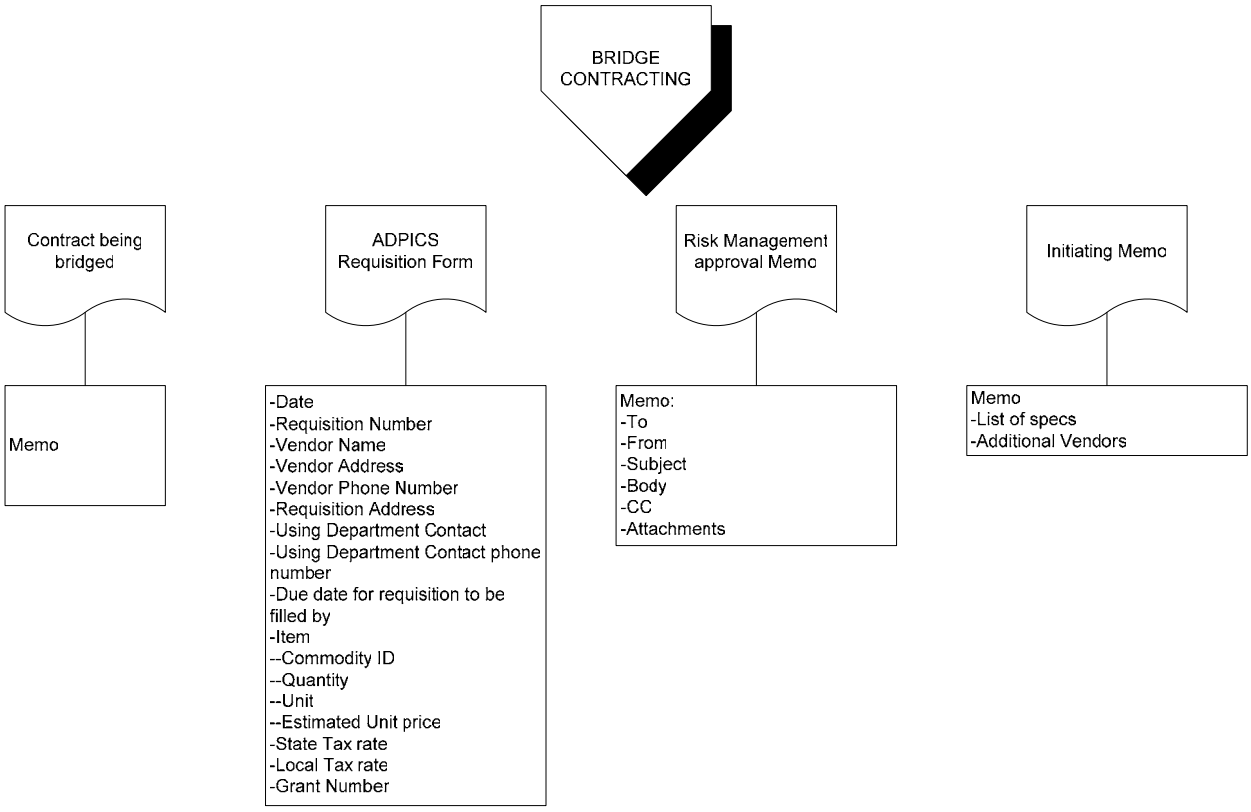

COMPETITIVE SEALED PROPOSAL
ADPICS Requisition Form
-Date
-Requisition Number
-Vendor Name
-Vendor Address
-Vendor Phone Number
-Requisition Address
-Using Department Contact
-Using Department Contact phone number
-Due date for requisition to be filled by
-Item
--Commodity ID
--Quantity
--Unit
--Estimated Unit price
-State Tax rate
-Local Tax rate
-Grant Number
Risk Management approval Memo
Memo:
-To
-From
-Subject
-Body
-CC
-Attachments
Initiating Memo
Memo
-List of specs
-Additional vendors
-Evaluation Criteria
RFP/REOI Approval Form
-RFP/REOI number
-description of good or service
-date received
-estimated annual price
-estimated total price
-draft advertising was submitted: yes/no
-list of potential contractors: yes/no
-QSC composed of at least three people and name and title of each member: yes/no
-Is any member of QSC not a public entity employee, if yes agency must have written CAO authorization: yes/no
-requisition identified (source of funding): yes/no
-agency memo summarizing RFP requirements: yes/no
-notice letter to contractors at the option of the Using department: yes/no
-Approval by procurement for deviation from normal 30 day response time from the date of public notice: yes/no
-optional information regarding pre-proposal conference yes/no
-Using department contact name, address, and phone number: yes/no
-description of the project, scope of services, and/or county's intent: yes/no
-Delivery, performance, and compensation of the scope of services: yes/no
-Agency must justify contract term if more than three years with approval with procurement: yes/no
-Logial explanation of the Method of Award and Evalution Criteria in a format similar to the RFP format: yes/no
-MFD Artificial Barrier form approved by Minority Procurement Officer: yes/no
-Listing of all required submissions in the RFP format yes/no
-Identification of the contract administrator
-RFP boiler plates (see form)
-Approval signatjure of Procurement specialist and date
-Approval signature of Senior Procurement Specialist and date
-Approval signature of manager and date
-Approcal signature of Director of the Office of Procurement and date

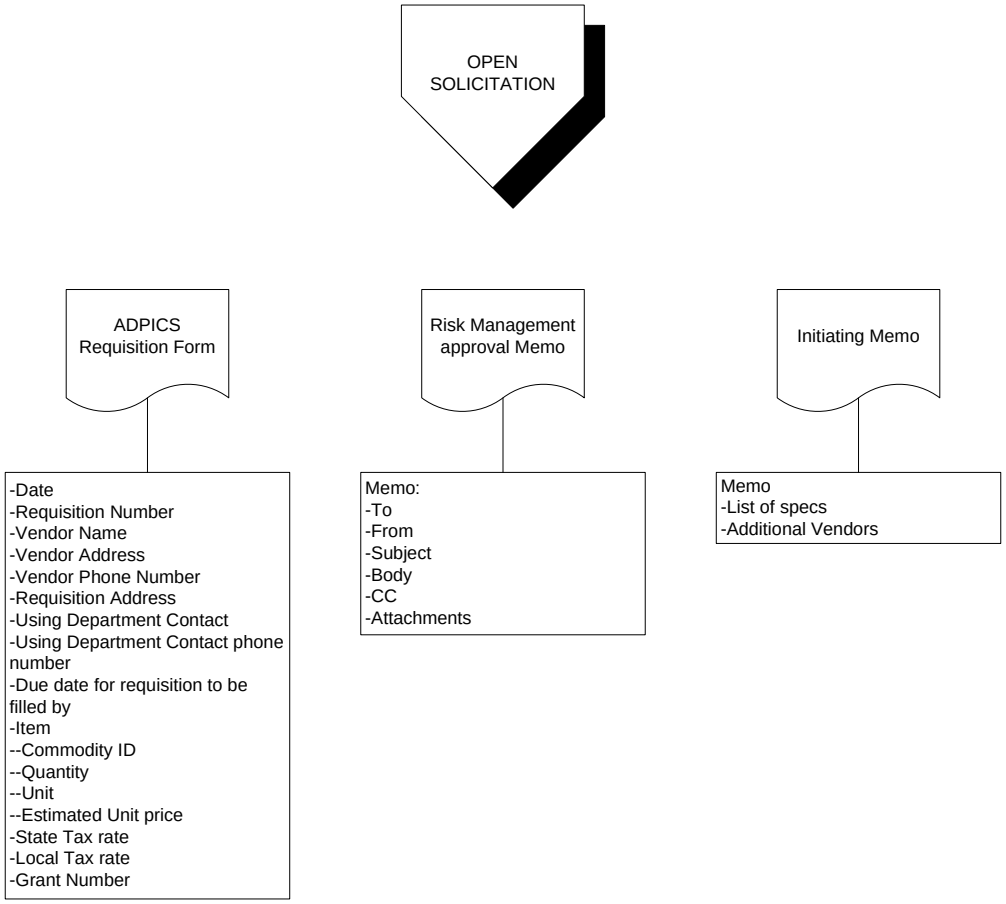

COMPETITIVE SEALED PROPOSAL (Con't)
Contractor Selection Checklist Form
-RFP number
-Estimated annual price
-Estimated total price
-Description of good or service
-Proposed awardees
-Names of QSC members
-Authorization by the CAO of a QSC member who is not an employee of a public entity
-Members changed
-Approval by the director for substitution of a QSC member
-Method of award: written proposals rated only/written and interview rated/other
-evaluation criteria: written proposals rated correctly/ interviews or demonstrations rated correctly/total scores by category correct/total scores not correct: see attached
-statement that contractor is responsible
-signed certification as to independent and impartial judgement
-procurement specialists name and date
-senior procurement specialist name and date
-manager name and date
-director of the office of procurement name and date
Bonding Requirements Form
-To
-From
-Date submitted to Minority Procurement Office (MPO)
-Date returned by Minority Procurement Office (MPO)
-IFB/RFP number
-Contract type: fixed/ requirement
-Estimated total price
-Requested performance bond value (%)
-Approved
-Approved by Approved by date
-Evaluation statement field
-Description of good or service
-Contract coordinator name and phone number
-Using department name and phone number
MFD Artificial Barrier Form
-Returned to procurement specialist name and date
-procurement specialist name and phone number
-submission date
-contract administrator name and phone number
-Using department name
-description of good or service
-solicitation number
-estimated value
-bid guarantee: yes/no
-bid guarantee amount
-bonding requirements: yes/ no
-bonding requirement amount
-terms and conditions: accepted/rejected/revisioned
-evaluation criteria: accepted/rejected/revisioned
-clauses which resitrict MFD: accepted/rejected/revisioned
-assurance of MFD on bidders list: accepted/ rejected/revisioned
-Other: accepted/rejected/ revisioned
-reccomendations/comments
-Minority procurement officer name and date
Solicitation Advertising Announcement Form
-Publication
-Publication name and date
-IFB/RFP/REOI number
-Description of good or service
-Using Deparment Contact
-Using Department contact phone number
-Open date and time
-Price
-Pre-bid date, time, and location
-Procurement Specialist


MINI CONTRACT
ADPICS Requisition Form
Risk Management approval Memo
Initiating Memo
-Date
-Requisition Number
-Vendor Name
-Vendor Address
-Vendor Phone Number
-Requisition Address
-Using Department Contact
-Using Department Contact phone number
-Due date for requisition to be filled by
-Item
--Commodity ID
--Quantity
--Unit
--Estimated Unit price
-State Tax rate
-Local Tax rate
-Grant Number
Memo:
-To
-From
-Subject
-Body
-CC
-Attachments
Memo
-List of specs
-Additional Vendors
-Evaluation Criteria

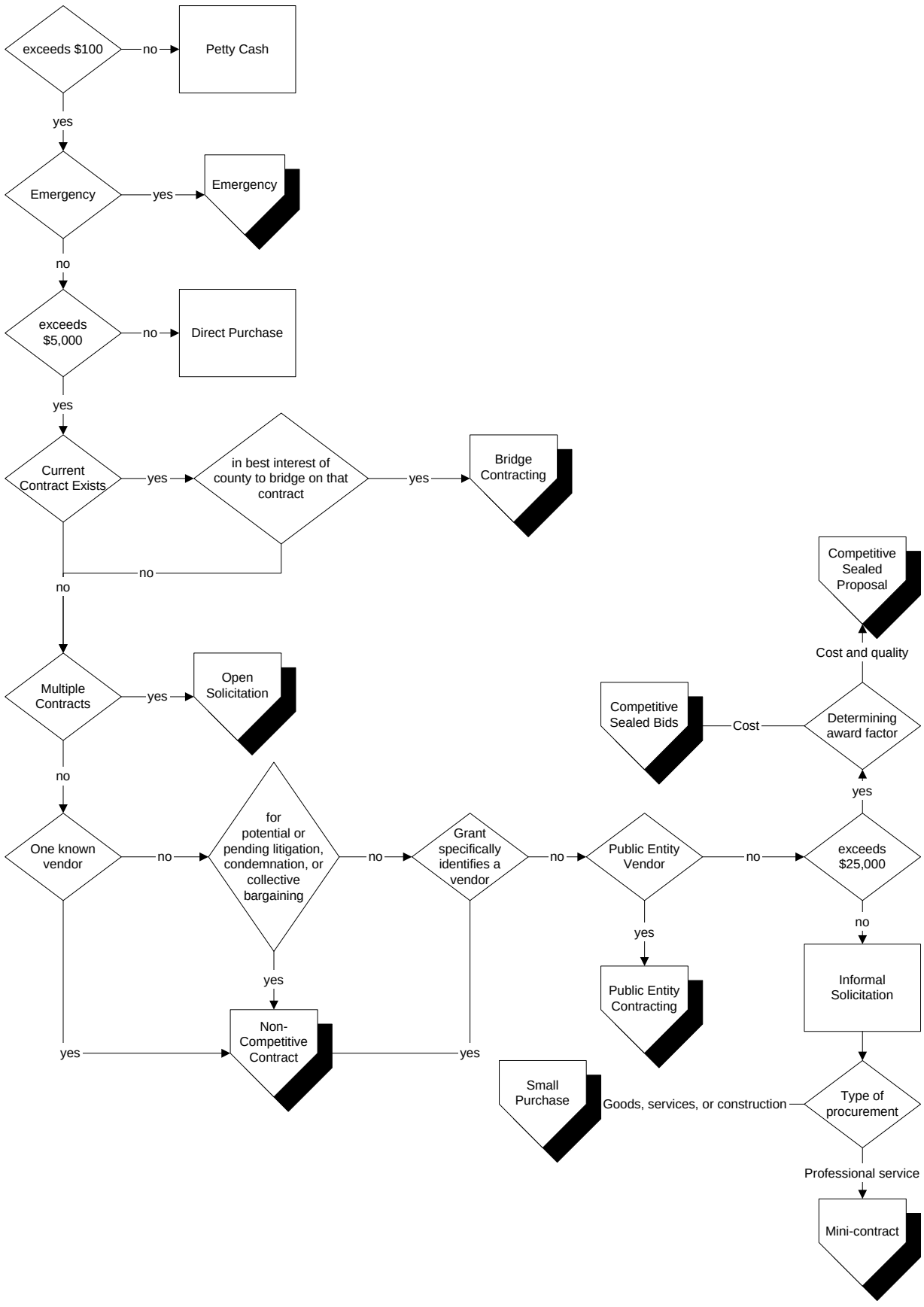

SMALL PURCHASE
ADPICS Requisition Form
Risk Management approval Memo
Initiating Memo
-Date
-Requisition Number
-Vendor Name
-Vendor Address
-Vendor Phone Number
-Requisition Address
-Using Department Contact
-Using Department Contact phone number
-Due date for requisition to be filled by
-Item
--Commodity ID
--Quantity
--Unit
--Estimated Unit price
-State Tax rate
-Local Tax rate
-Grant Number
Memo:
-To
-From
-Subject
-Body
-CC
-Attachments
Memo
-List of specs
-Additional Vendors

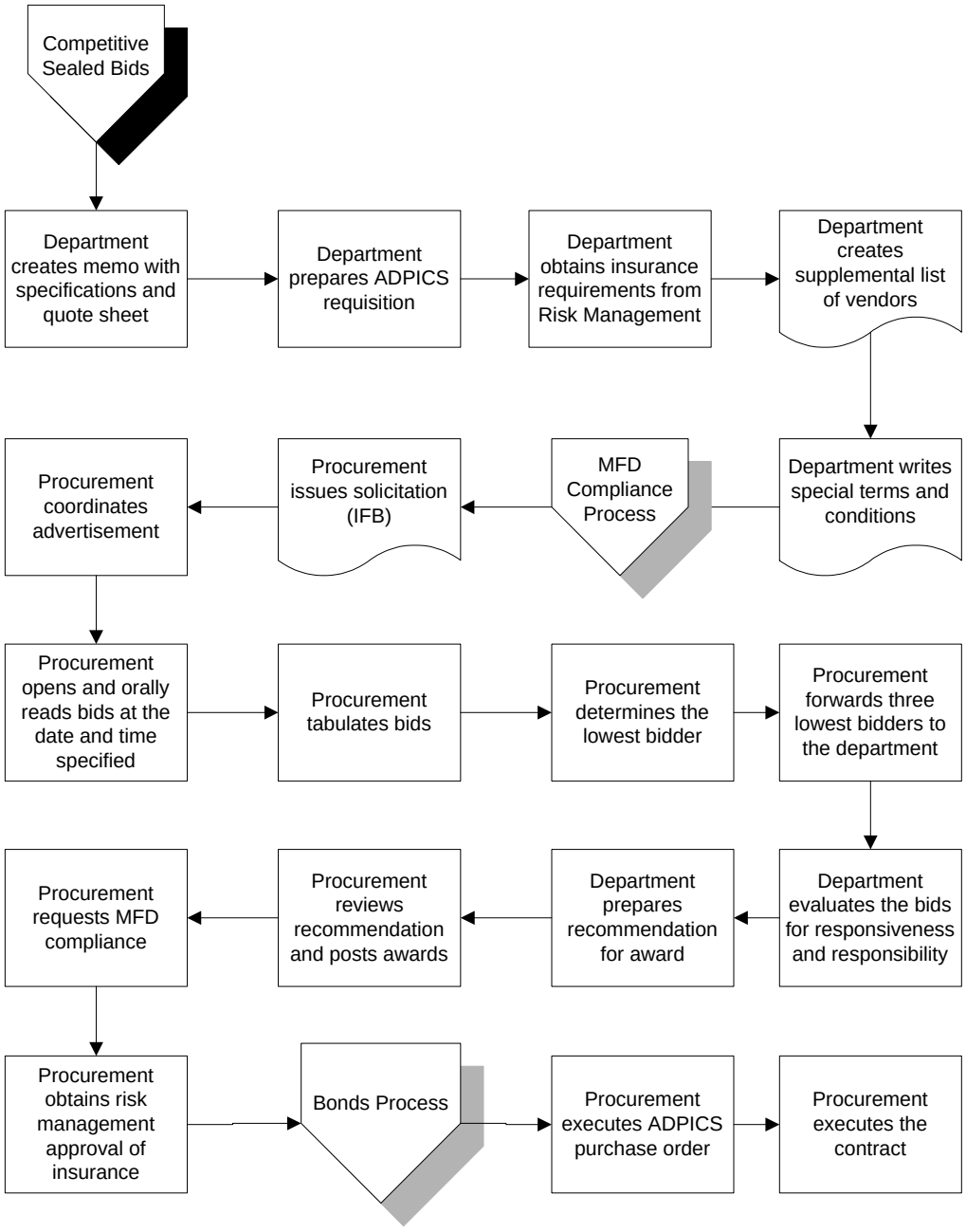

NON-COMPETITIVE PURCHASE
ADPICS Requisition Form
-Date
-Requisition Number
-Vendor Name
-Vendor Address
-Vendor Phone Number
-Requisition Address
-Using Department Contact
-Using Department Contact phone number
-Due date for requisition to be filled by
-Item
--Commodity ID
--Quantity
--Unit
--Estimated Unit price
-State Tax rate
-Local Tax rate
-Grant Number
Risk Management approval Memo
Memo:
-To
-From
-Subject
-Body
-CC
-Attachments
Initiating Memo
Memo
-List of specs
-Additional Vendors
CRC Routing Form
-CRC action reviewed by (name and initial)
-Date
-Procurement Speicialist name
-Senior Procurement Specialist name
-Manager name
-Procurement issues
-Action: Submit for CRC agenda/Notify Department of the above issues
-Department response to Procurement Issues: will discuss or justify issues at meething/will defer request and re-submit
-Reviewer initlas

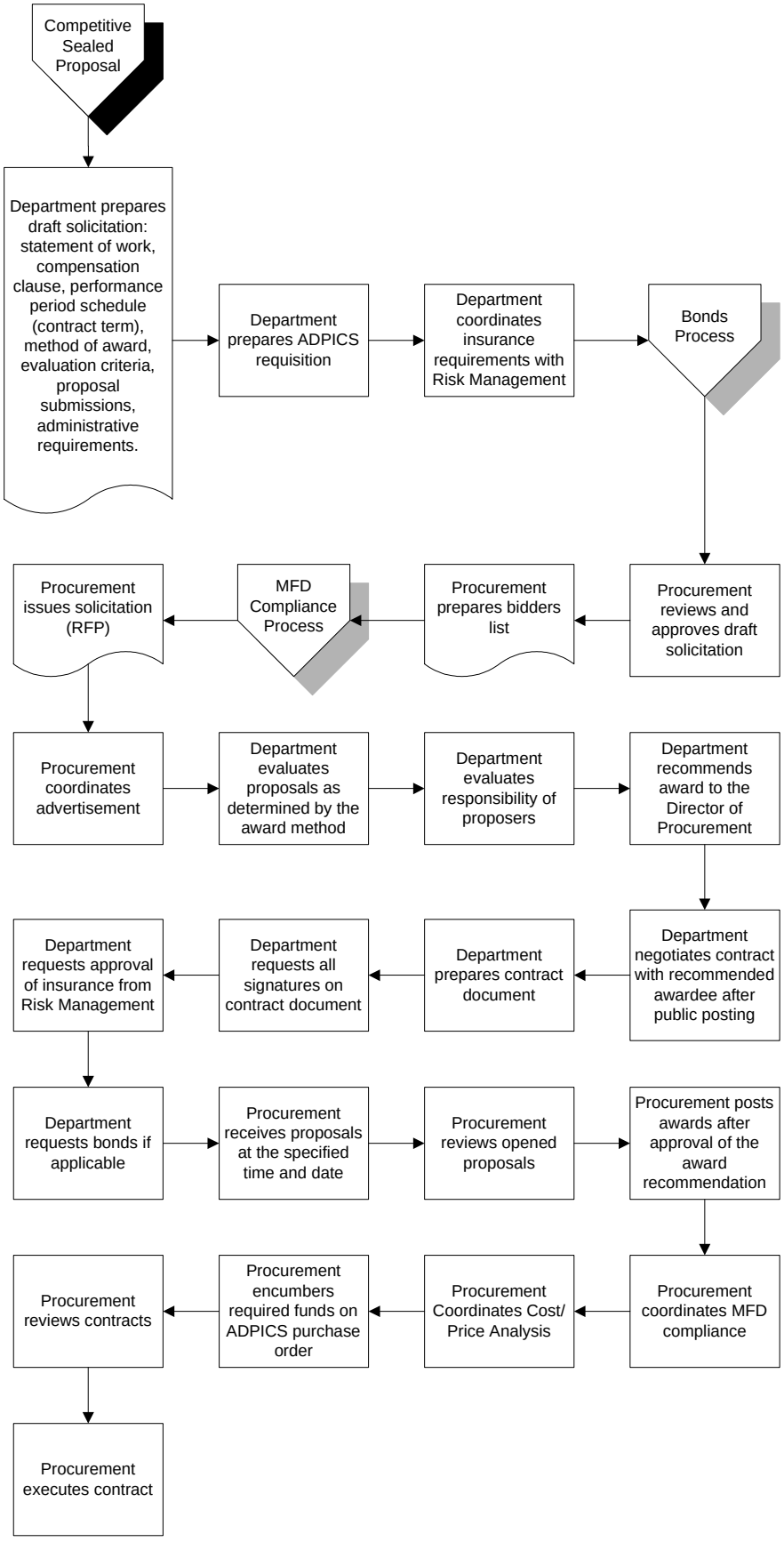

BRIDGE CONTRACTING
Contract being bridged
Memo
ADPICS Requisition Form
-Date
-Requisition Number
-Vendor Name
-Vendor Address
-Vendor Phone Number
-Requisition Address
-Using Department Contact
-Using Department Contact phone number
-Due date for requisition to be filled by
-Item
--Commodity ID
--Quantity
--Unit
--Estimated Unit price
-State Tax rate
-Local Tax rate
-Grant Number
Risk Management approval Memo
Memo:
-To
-From
-Subject
-Body
-CC
-Attachments
Initiating Memo
Memo
-List of specs
-Additional Vendors

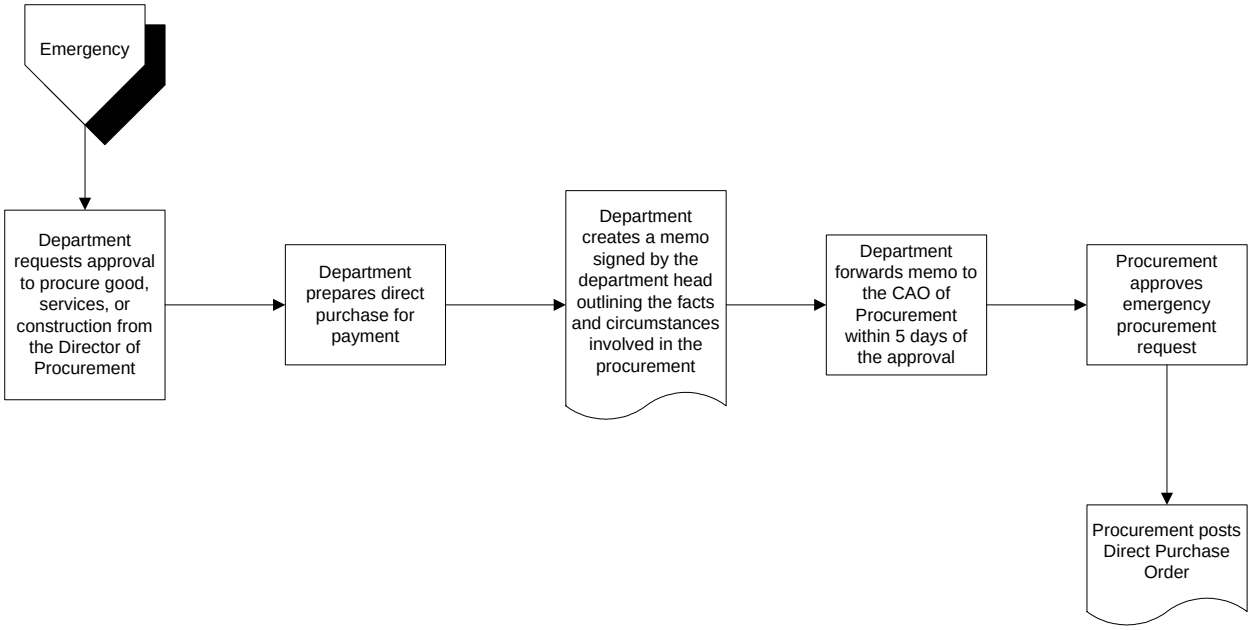

OPEN
SOLICITATION
ADPICS
Requisition Form
-Date
-Requisition Number
-Vendor Name
-Vendor Address
-Vendor Phone Number
-Requisition Address
-Using Department Contact
-Using Department Contact phone number
-Due date for requisition to be filled by
-Item
--Commodity ID
--Quantity
--Unit
--Estimated Unit price
-State Tax rate
-Local Tax rate
-Grant Number
Risk Management approval Memo
Memo:
-To
-From
-Subject
-Body
-CC
-Attachments
Initiating Memo
Memo
-List of specs
-Additional Vendors

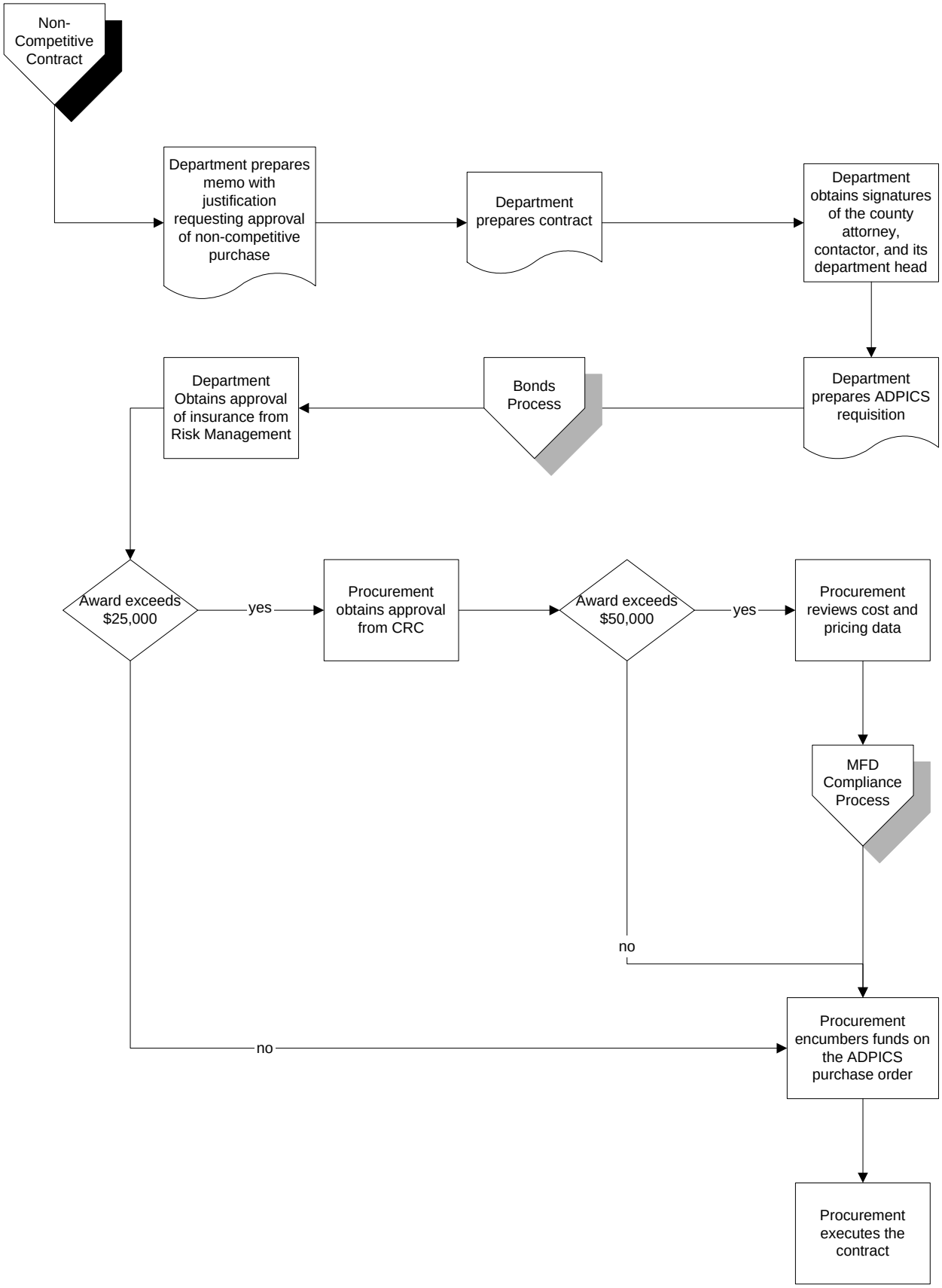
Appendix D Process Flowchart

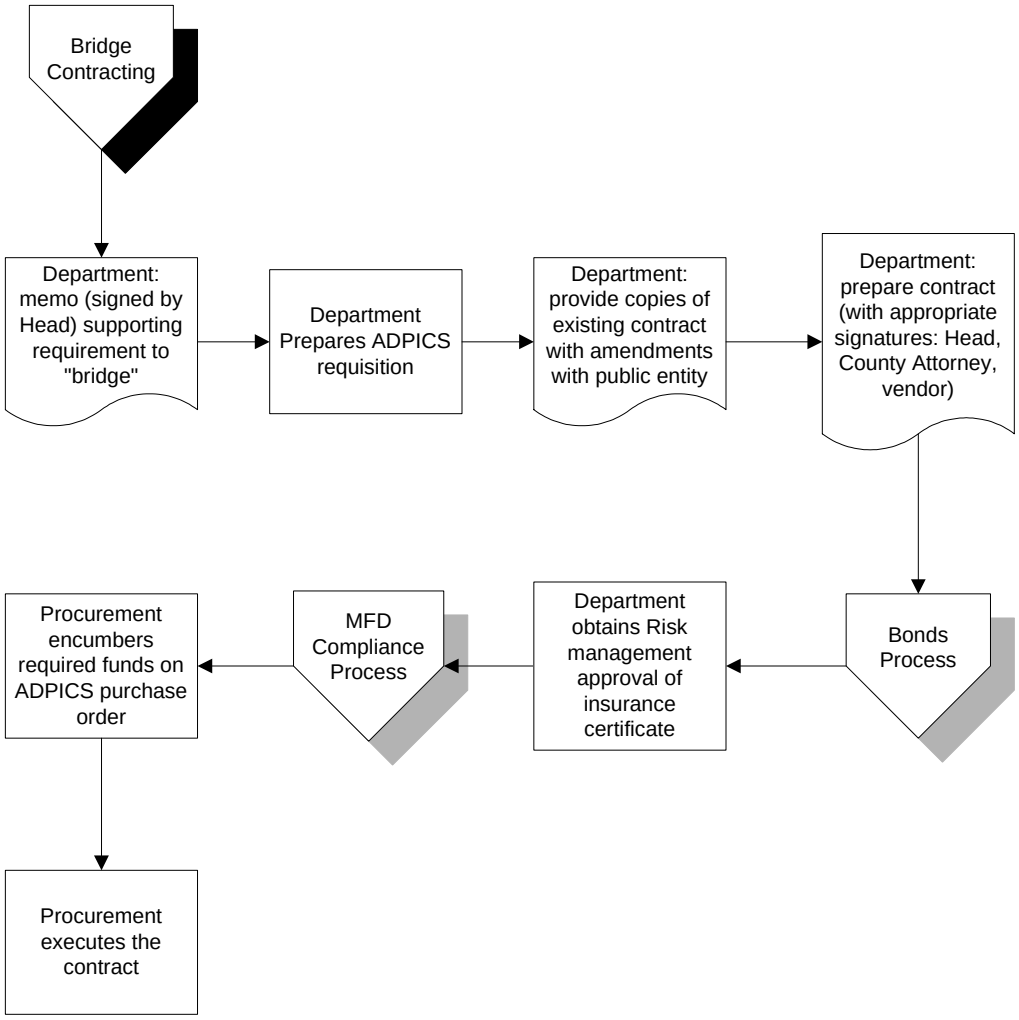

exceeds $100
no
Petty Cash
yes
Emergency
yes
Emergency
no
exceeds $5,000
no
Direct Purchase
yes
Current Contract Exists
yes
in best interest of county to bridge on that contract
yes
Bridge Contracting
no
no
Multiple Contracts
yes
Open Solicitation
no
One known vendor
no
for potential or pending litigation, condemnation, or collective bargaining
no
Grant specifically identifies a vendor
no
Public Entity Vendor
no
exceeds $25,000
yes
Competitive Sealed Proposal
Cost and quality
Competitive Sealed Bids
Cost
Determining award factor
yes
no
Informal Solicitation
yes
Public Entity Contracting
yes
Non-Competitive Contract
yes
yes
Small Purchase
Goods, services, or construction
Type of procurement
Professional service
Mini-contract

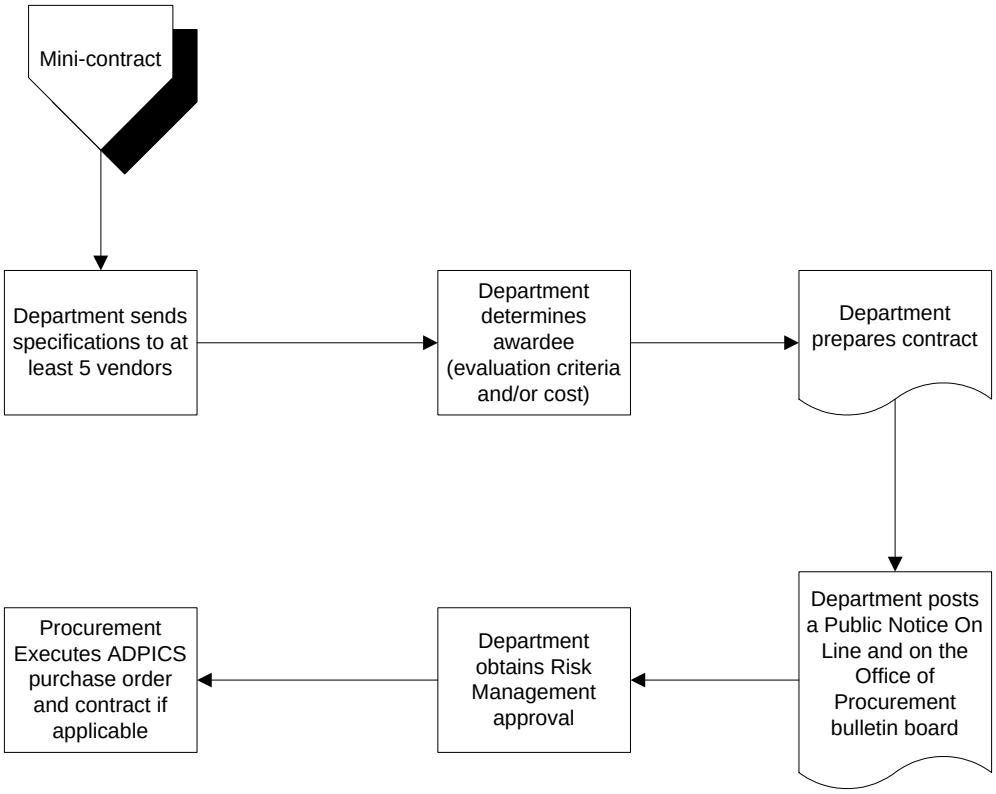

Competitive Sealed Bids
Department creates memo with specifications and quote sheet
Department prepares ADPICS requisition
Department obtains insurance requirements from Risk Management
Department creates supplemental list of vendors
Department writes special terms and conditions
MFD Compliance Process
Procurement issues solicitation (IFB)
Procurement coordinates advertisement
Procurement opens and orally reads bids at the date and time specified
Procurement tabulates bids
Procurement determines the lowest bidder
Procurement forwards three lowest bidders to the department
Department evaluates the bids for responsiveness and responsibility
Department prepares recommendation for award
Procurement reviews recommendation and posts awards
Procurement requests MFD compliance
Procurement obtains risk management approval of insurance
Bonds Process
Procurement executes ADPICS purchase order
Procurement executes the contract

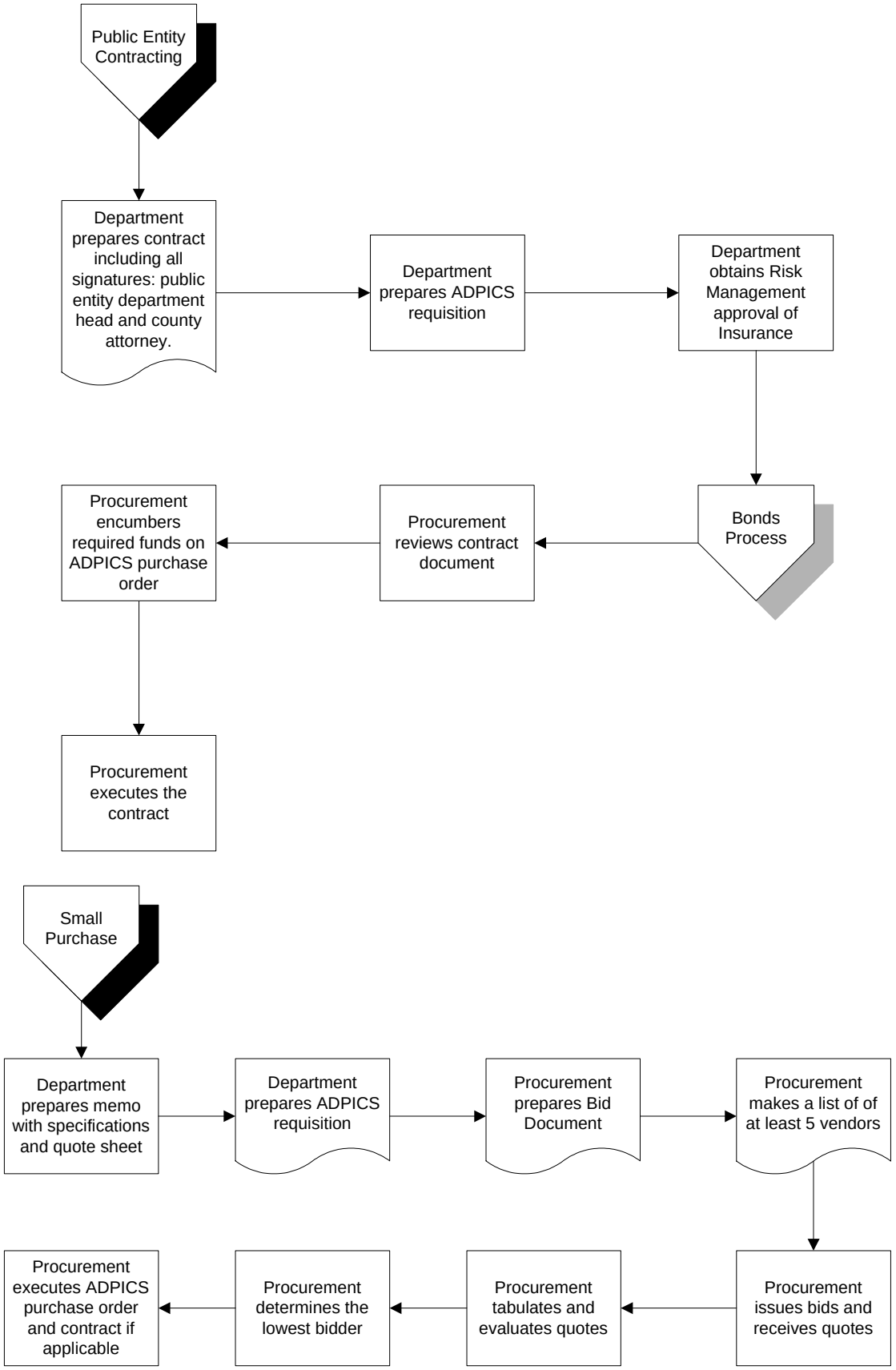

Competitive Sealed Proposal
Department prepares draft solicitation: statement of work, compensation clause, performance period schedule (contract term), method of award, evaluation criteria, proposal submissions, administrative requirements.
Department prepares ADPICS requisition
Department coordinates insurance requirements with Risk Management
Bonds Process
Procurement reviews and approves draft solicitation
Procurement prepares bidders list
MFD Compliance Process
Procurement issues solicitation (RFP)
Procurement coordinates advertisement
Department evaluates proposals as determined by the award method
Department evaluates responsibility of proposers
Department recommends award to the Director of Procurement
Department negotiates contract with recommended awardee after public posting
Department prepares contract document
Department requests all signatures on contract document
Department requests approval of insurance from Risk Management
Department requests bonds if applicable
Procurement receives proposals at the specified time and date
Procurement reviews opened proposals
Procurement posts awards after approval of the award recommendation
Procurement coordinates MFD compliance
Procurement Coordinates Cost/ Price Analysis
Procurement encumbers required funds on ADPICS purchase order
Procurement reviews contracts
Procurement executes contract

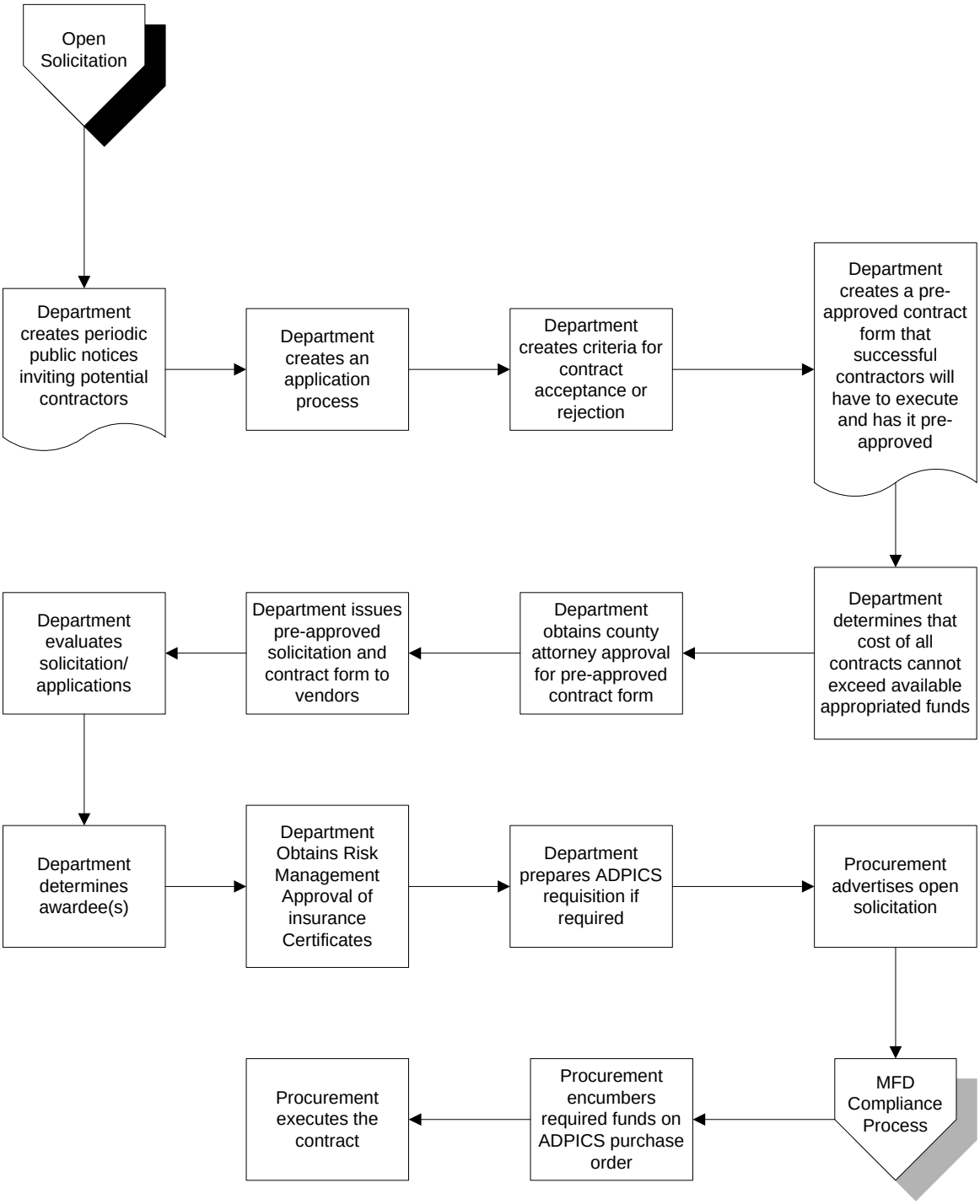

Emergency
Department requests approval to procure good, services, or construction from the Director of Procurement
Department prepares direct purchase for payment
Department creates a memo signed by the department head outlining the facts and circumstances involved in the procurement
Department forwards memo to the CAO of Procurement within 5 days of the approval
Procurement approves emergency procurement request
Procurement posts Direct Purchase Order

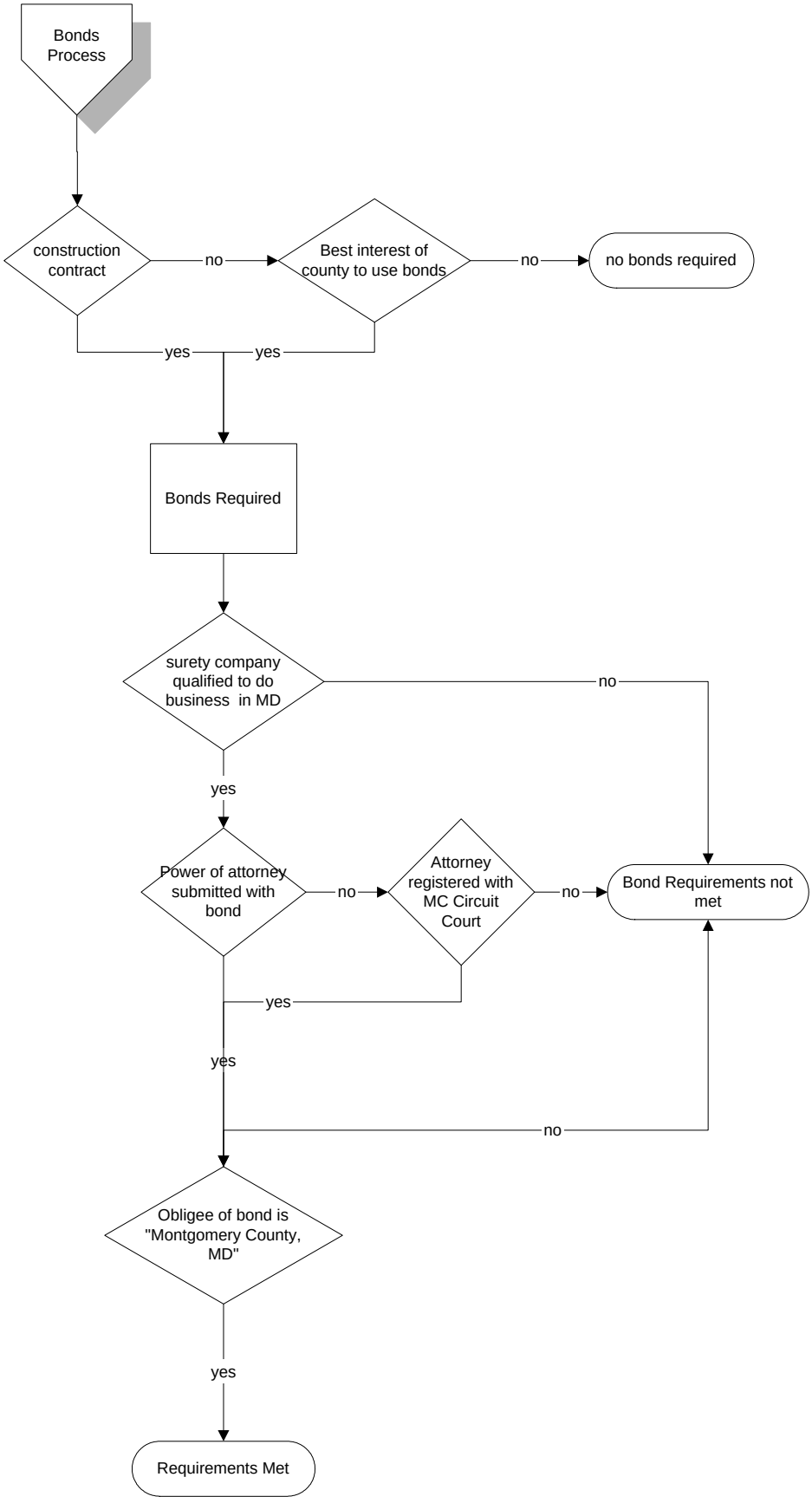

Non-Competitive Contract
Department prepares memo with justification requesting approval of non-competitive purchase
Department prepares contract
Department obtains signatures of the county attorney, contactor, and its department head
Department prepares ADPICS requisition
Bonds Process
Department Obtains approval of insurance from Risk Management
Award exceeds $25,000
yes
Procurement obtains approval from CRC
Award exceeds $50,000
yes
Procurement reviews cost and pricing data
MFD Compliance Process
no
no
Procurement encumbers funds on the ADPICS purchase order
Procurement executes the contract

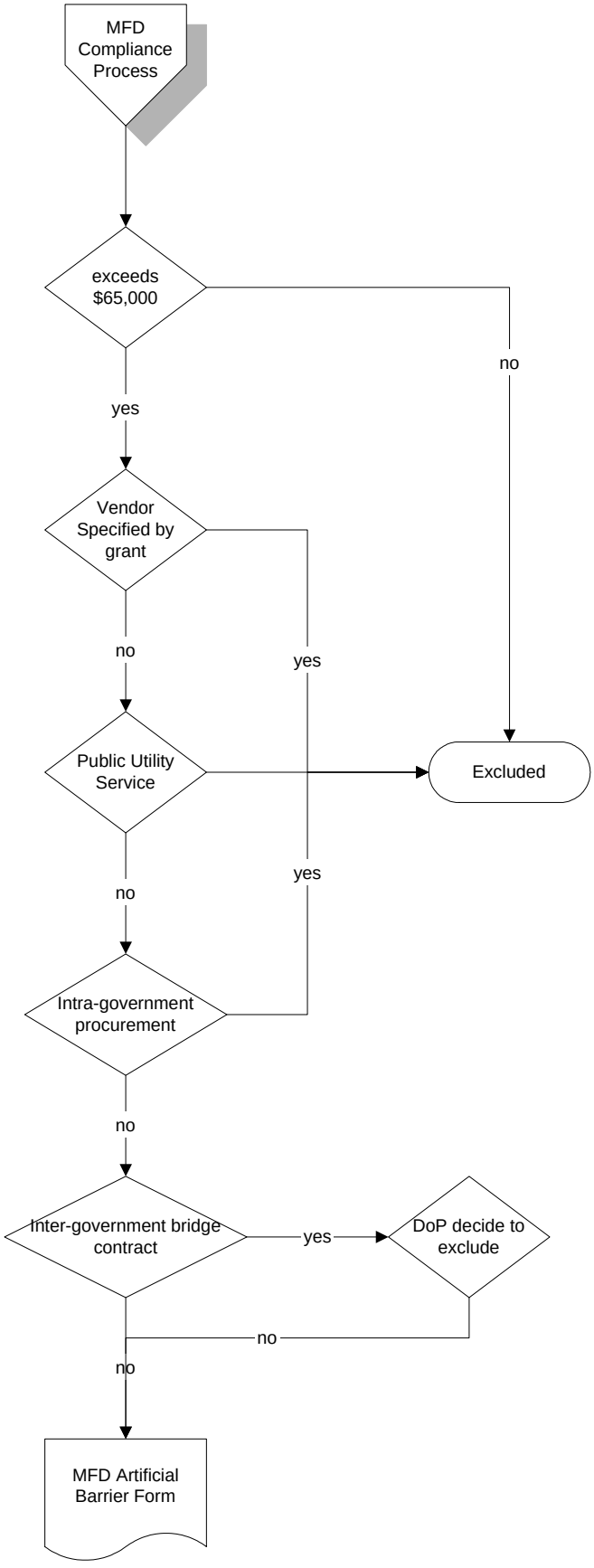

Bridge Contracting
Department: memo (signed by Head) supporting requirement to "bridge"
Department Prepares ADPICS requisition
Department: provide copies of existing contract with amendments with public entity
Department: prepare contract (with appropriate signatures: Head, County Attorney, vendor)
Bonds Process
Department obtains Risk management approval of insurance certificate
MFD Compliance Process
Procurement encumbers required funds on ADPICS purchase order
Procurement executes the contract


Mini-contract
Department sends specifications to at least 5 vendors
Department determines awardee (evaluation criteria and/or cost)
Department prepares contract
Department posts a Public Notice On Line and on the Office of Procurement bulletin board
Department obtains Risk Management approval
Procurement Executes ADPICS purchase order and contract if applicable


Public Entity Contracting
Department prepares contract including all signatures: public entity department head and county attorney.
Department prepares ADPICS requisition
Department obtains Risk Management approval of Insurance
Bonds Process
Procurement reviews contract document
Procurement encumbers required funds on ADPICS purchase order
Procurement executes the contract
Small Purchase
Department prepares memo with specifications and quote sheet
Department prepares ADPICS requisition
Procurement prepares Bid Document
Procurement makes a list of of at least 5 vendors
Procurement issues bids and receives quotes
Procurement tabulates and evaluates quotes
Procurement determines the lowest bidder
Procurement executes ADPICS purchase order and contract if applicable


Open Solicitation
Department creates periodic public notices inviting potential contractors
Department creates an application process
Department creates criteria for contract acceptance or rejection
Department creates a pre-approved contract form that successful contractors will have to execute and has it pre-approved
Department determines that cost of all contracts cannot exceed available appropriated funds
Department obtains county attorney approval for pre-approved contract form
Department issues pre-approved solicitation and contract form to vendors
Department evaluates solicitation/ applications
Department determines awardee(s)
Department Obtains Risk Management Approval of insurance Certificates
Department prepares ADPICS requisition if required
Procurement advertises open solicitation
MFD Compliance Process
Procurement encumbers required funds on ADPICS purchase order
Procurement executes the contract


Bonds Process
construction contract
no
Best interest of county to use bonds
no
no bonds required
yes
yes
Bonds Required
surety company qualified to do business in MD
no
yes
Power of attorney submitted with bond
no
Attorney registered with MC Circuit Court
no
Bond Requirements not met
yes
yes
no
Obligee of bond is "Montgomery County, MD"
yes
Requirements Met


MFD Compliance Process
exceeds $65,000
no
yes
Vendor Specified by grant
yes
no
Public Utility Service
Excluded
yes
no
Intra-government procurement
yes
no
Inter-government bridge contract
yes
DoP decide to exclude
no
no
MFD Artificial Barrier Form

Appendix E XML Use and Naming Guide

This document describes the proper use of XML for the Montgomery County Office of Procurement. It describes the techniques and coding styles that should be employed in future development of XML Schemas and some related technologies.

E.1. Naming

When creating schemas, names should comply with Java Code Naming Conventions (see http://java.sun.com/docs/codeconv/html/CodeConventions.doc8.html), where a schema name would equate to a Java class, and a field would equate to a Java class variable. What this means is that a schema name or type definition name "should be nouns, in mixed case with the first letter of each internal word capitalized." For example, a schema for a memo would be called "Memo," or a schema for a procurement specialist might be called "ProcurementSpecialist."

E.2. Inheritance

Many of the schemas that have been created fit into generalized categories. A system of inheritance has been devises so that features can be added to every schema of a certain category all at once. Some of the categories that have been identified include:

- Entities
- Documents
- Audit Events
- Unique Identifiers (a special type of field)

The advantage to defining these categories and having other schemas extend them is that features can be added later to the category's schema (i.e. Entity or Document or AuditEvent), and that feature will automatically become available to all types of schemas in that category.

Features such as document change tracking could be added to the category's schema later, and the feature would then become available in all schemas that extend that schema.

E.3. File Inclusion

Each type that has been defined lives in its own schema file. This organizational method means that the Document abstract type is defined in one file, while each extension of that type would have its own file. Because of the use of multiple files, it is necessary to "include" references to other schemas that contain relevant definitions in them. For example, the "ScopeOfWork" schema definition must include the Document schema because it extends that type and would otherwise not know what a "Document" is.

Only the category schemas should have root elements defined for them. For example, a schema should be created with a root element "document" of type "Document" (note the capitalization here), but no root element of type "ScopeOfWork" should be defined since that is not a category but a derived type. When creating an XML file for any type of document, you would use the "xsi:type" attribute to indicate the specific type of Document that the file will create.

The system of file includes has a flaw that should be addressed in the future. In order for the "document" schema to know every type of Document you might create, it is necessary for the schema to include the schemas for all other types of Documents. This creates a kind of circular referencing that is not ideal for XML because if more types are created to extend Document later, you will have to update the document schema to refer to the new type you have just created. At this time no better option has found to avoid this situation.

E.4. Unique Identifiers

For entities and documents, a field for a unique identifier has been created so that items can exist outside of individual documents and refer to an external source of that data. In this scenario, the unique identifier becomes a "reference" to an external definition of what data would be able to complete that field. Independent XML databases could be maintained to hold the full information about the entities or documents these identifiers refer to.

This form of reference/lookup is useful for limiting data repetition and for minimizing errors during data input. For example, in a solicitation the procurement specialist and using department must both be specified. If every solicitation required inputting the full information about both of these entities (possibly in multiple places), a great amount of storage space would be wasted, and entering the information would take more time. If a single identifier could be used for the procurement specialist and another for the using department, these identifiers could be the only information required to refer to the full information about both entities. This method will not only save time when entering data, but also prevent misspellings and other typographical mistakes in the information associated with those entities. Furthermore, changes in the referenced information need only be changed in a single place in order to update all references to it.

E.5. eXtensible Stylesheet Language Transformation (XSLT)

XSLT is a way of transforming XML information into other formats. For the purpose of the Office of Procurement, it can be used to create "static" versions of any document that should not change over time. These transforms can also be used to generate new documents based on the information contained in an XML document.

An example of how this technology could be used is in generating RFPs. A schema has been written for an RFP, but the information in it can be taken directly from a collection of solicitation documents. Using an XSLT, an RFP XML file can be created (based on the schema for an RFP), and this XML can then be plugged directly into a boilerplate to generate a completed RFP. Little or no additional work would need to be done if the solicitation XML file used to generate the RFP was complete and correct.

E.6. Audit Log

To maintain a trail of accountability, it is necessary to track when an event occurs on a document, who triggered the event, and the nature of the event. The audit log mechanism is designed to be transparent to the user, but available to the system for looking up information it contains if it is needed later.

The usefulness of the audit log is in the tracking of events. From the contents of an audit log, many useful reports can be later generated. For example, a simple script could be used to calculate the time between two events in the log (such as the initiating memo being received and the RFP being generated). Additionally, an XSLT could be created to show, in-detail, the history of one particular document from a specific solicitation. This information could then be displayed in any number of formats, including HTML.

Appendix F XML

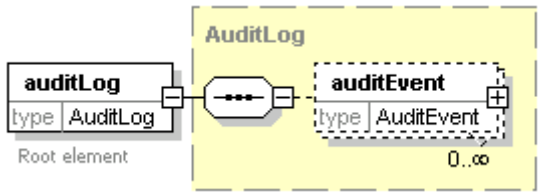
F.1. AuditLog.xsd

schema location: **AuditLog.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Elements	Complex types
auditLog	**ApprovedEvent**
	AuditEvent
	AuditLog
	CompletedEvent
	ModifiedEvent
	NewDocumentEvent
	RejectedEvent
	UnCompletedEvent

element **auditLog**

diagram



type **AuditLog**

properties
content complex

children **auditEvent**

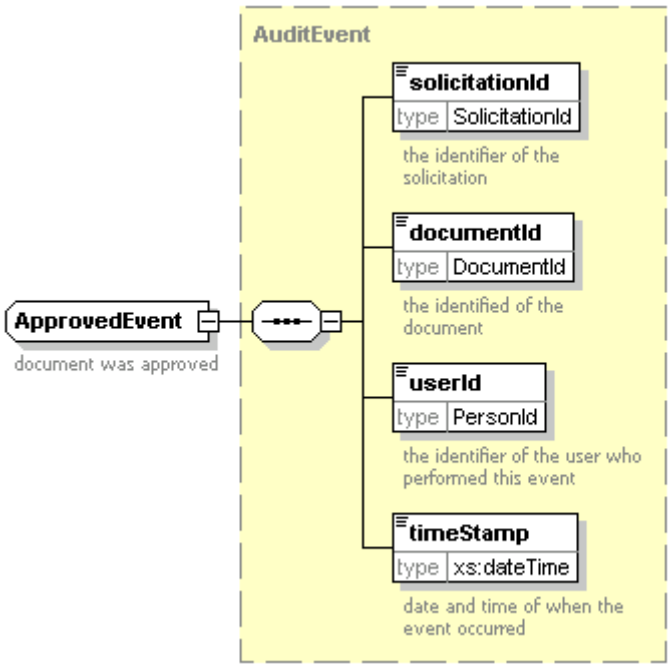
annotation
documentation Root element

source

```
<xs:element name="auditLog" type="AuditLog">
  <xs:annotation>
    <xs:documentation>Root element</xs:documentation>
  </xs:annotation>
</xs:element>
```

complexType **ApprovedEvent**

diagram



type extension of **AuditEvent**

properties base AuditEvent

children **solicitationId** **documentId** **userId** **timeStamp**

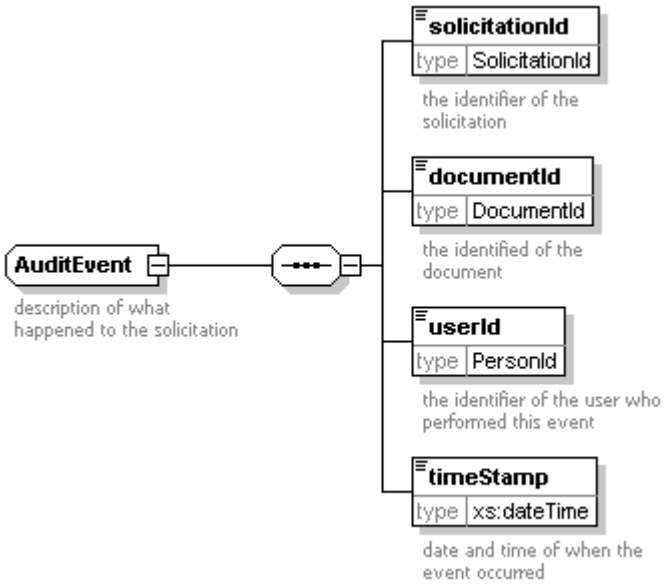
annotation documentation document was approved

source

```
<xs:complexType name="ApprovedEvent">
  <xs:annotation>
    <xs:documentation>document was approved</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="AuditEvent"/>
  </xs:complexContent>
</xs:complexType>
```

complexType **AuditEvent**

diagram



properties
- abstract true

children **solicitationId** **documentId** **userId** **timeStamp**

used by
- element **AuditLog/auditEvent**
- complexTypes **ApprovedEvent** **CompletedEvent** **ModifiedEvent** **NewDocumentEvent** **RejectedEvent**

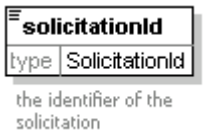
annotation
- documentation description of what happened to the solicitation

source

```
<xs:complexType name="AuditEvent" abstract="true">
 <xs:annotation>
  <xs:documentation>description of what happened to the solicitation</xs:documentation>
 </xs:annotation>
 <xs:sequence>
  <xs:element name="solicitationId" type="SolicitationId">
   <xs:annotation>
    <xs:documentation>the identifier of the solicitation</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="documentId" type="DocumentId" nillable="true">
   <xs:annotation>
    <xs:documentation>the identified of the document</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="userId" type="PersonId">
   <xs:annotation>
    <xs:documentation>the identifier of the user who performed this event</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="timeStamp" type="xs:dateTime">
   <xs:annotation>
    <xs:documentation>date and time of when the event occurred</xs:documentation>
   </xs:annotation>
  </xs:element>
 </xs:sequence>
</xs:complexType>
```

element **AuditEvent/solicitationId**

diagram



type **SolicitationId**

properties
- isRef 0
- content complex

annotation
- documentation the identifier of the solicitation

source

```
<xs:element name="solicitationId" type="SolicitationId">
  <xs:annotation>
    <xs:documentation>the identifier of the solicitation</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **AuditEvent/documentId**

diagram

type **DocumentId**

properties
- isRef 0
- content complex
- nillable true

annotation
- documentation the identified of the document

source

```
<xs:element name="documentId" type="DocumentId" nillable="true">
  <xs:annotation>
    <xs:documentation>the identified of the document</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **AuditEvent/userId**

diagram

type **PersonId**

properties
- isRef 0
- content complex

annotation
- documentation the identifier of the user who performed this event

source

```
<xs:element name="userId" type="PersonId">
  <xs:annotation>
    <xs:documentation>the identifier of the user who performed this event</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **AuditEvent/timeStamp**

diagram

type **xs:dateTime**

properties
- isRef 0
- content simple

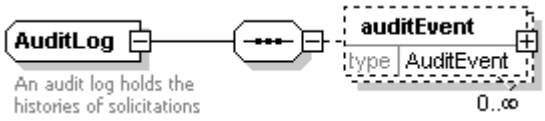
annotation
- documentation date and time of when the event occurred

source

```
<xs:element name="timeStamp" type="xs:dateTime">
 <xs:annotation>
  <xs:documentation>date and time of when the event occurred</xs:documentation>
 </xs:annotation>
</xs:element>
```

complexType **AuditLog**

diagram



children **auditEvent**

used by
- element **auditLog**

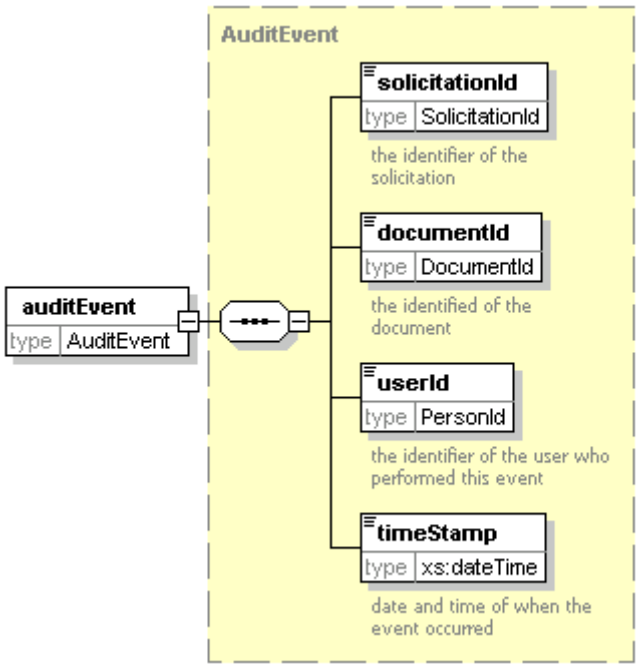
annotation
- documentation An audit log holds the histories of solicitations

source

```
<xs:complexType name="AuditLog">
 <xs:annotation>
  <xs:documentation>An audit log holds the histories of solicitations</xs:documentation>
 </xs:annotation>
 <xs:sequence>
  <xs:element name="auditEvent" type="AuditEvent" minOccurs="0" maxOccurs="unbounded"/>
 </xs:sequence>
</xs:complexType>
```

element **AuditLog/auditEvent**

diagram



type **AuditEvent**

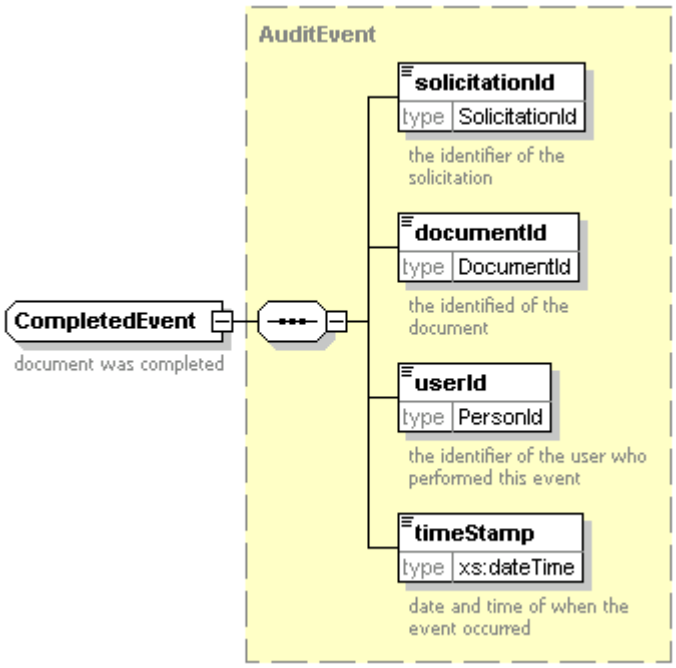
properties
isRef 0
content complex

children **solicitationId** **documentId** **userId** **timeStamp**

source
```
<xs:element name="auditEvent" type="AuditEvent" minOccurs="0" maxOccurs="unbounded"/>
```

complexType **CompletedEvent**

diagram



type extension of **AuditEvent**

properties
- base AuditEvent

children **solicitationId** **documentId** **userId** **timeStamp**

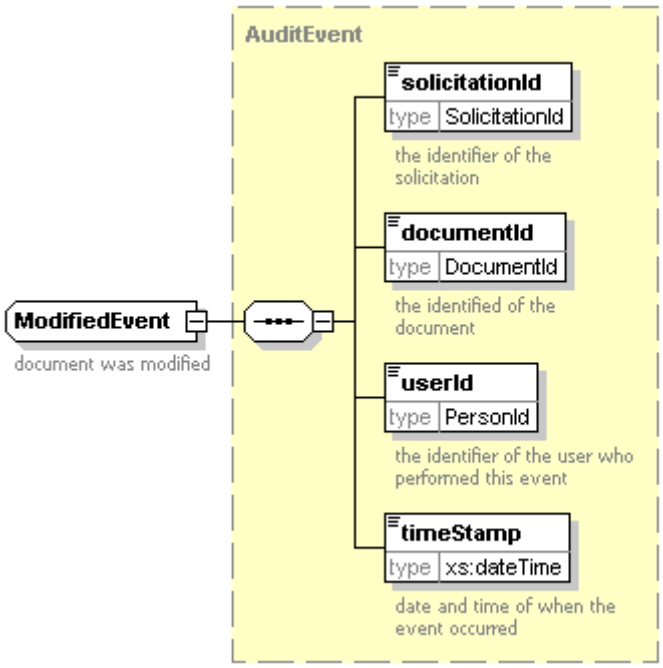
annotation
- documentation document was completed

source

```
<xs:complexType name="CompletedEvent">
  <xs:annotation>
    <xs:documentation>document was completed</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="AuditEvent"/>
  </xs:complexContent>
</xs:complexType>
```

complexType **ModifiedEvent**

diagram



type extension of **AuditEvent**

properties base AuditEvent

children **solicitationId documentId userId timeStamp**

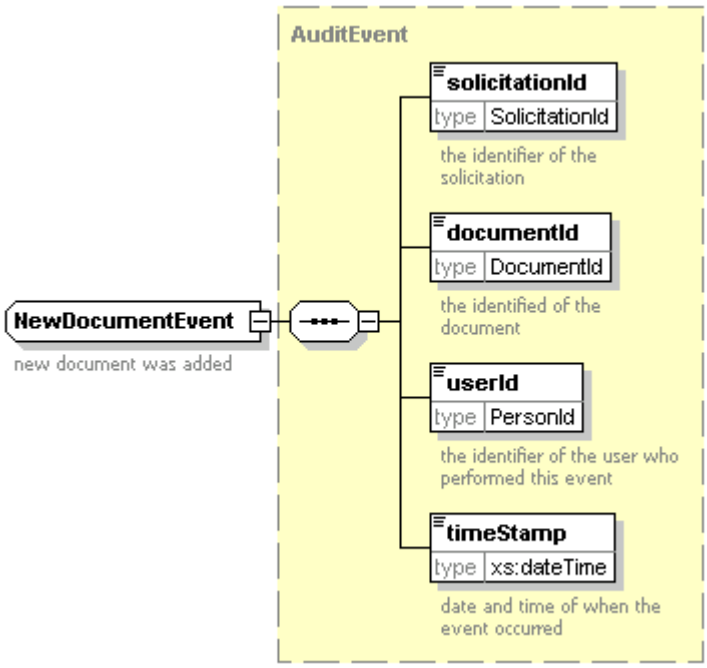
annotation documentation document was modified

source

```
<xs:complexType name="ModifiedEvent">
  <xs:annotation>
    <xs:documentation>document was modified</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="AuditEvent"/>
  </xs:complexContent>
</xs:complexType>
```

complexType **NewDocumentEvent**

diagram



type extension of **AuditEvent**

properties
- base AuditEvent

children **solicitationId** **documentId** **userId** **timeStamp**

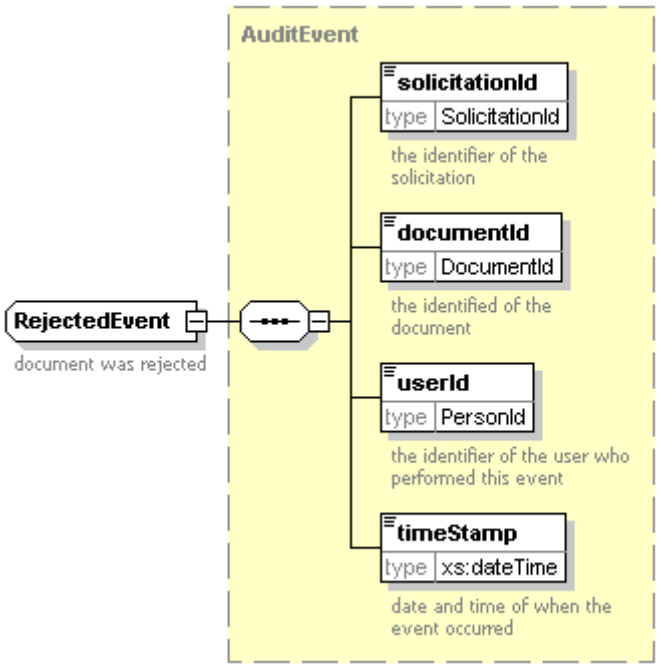
annotation
- documentation new document was added

source

```
<xs:complexType name="NewDocumentEvent">
  <xs:annotation>
    <xs:documentation>new document was added</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="AuditEvent"/>
  </xs:complexContent>
</xs:complexType>
```

complexType **RejectedEvent**

diagram



type extension of **AuditEvent**

properties base AuditEvent

children **solicitationId** **documentId** **userId** **timeStamp**

annotation documentation document was rejected

source

```
<xs:complexType name="RejectedEvent">
  <xs:annotation>
    <xs:documentation>document was rejected</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="AuditEvent"/>
  </xs:complexContent>
</xs:complexType>
```

complexType **UnCompletedEvent**

diagram

annotation documentation document that previously completed has been remarked as incomplete

source

```
<xs:complexType name="UnCompletedEvent">
  <xs:annotation>
    <xs:documentation>document that previously completed has been remarked as incomplete</xs:documentation>
  </xs:annotation>
</xs:complexType>
```

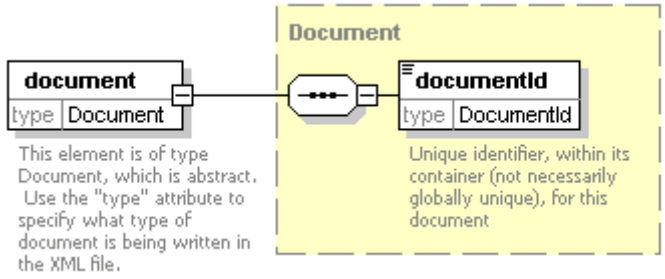
F.2. document.xsd

schema location: **document.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Elements
document

element **document**

diagram



type **Document**

properties
content complex

children **documentId**

annotation
documentation This element is of type Document, which is abstract. Use the "type" attribute to specify what type of document is being written in the XML file.

source

```
<xs:element name="document" type="Document">
  <xs:annotation>
    <xs:documentation>This element is of type Document, which is abstract.  Use the "type" attribute to specify what type of document is being written in the XML file.</xs:documentation>
  </xs:annotation>
</xs:element>
```

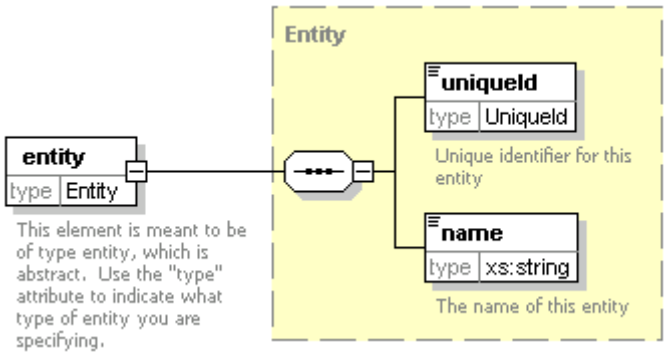
F.3. entity.xsd

schema location: **entity.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Elements
entity

element **entity**

diagram



type **Entity**

properties content complex

children **uniqueId** **name**

annotation documentation This element is meant to be of type entity, which is abstract. Use the "type" attribute to indicate what type of entity you are specifying.

source

```
<xs:element name="entity" type="Entity">
  <xs:annotation>
    <xs:documentation>This element is meant to be of type entity, which is abstract.  Use the "type" attribute to indicate what type of entity you are specifying.</xs:documentation>
  </xs:annotation>
</xs:element>
```

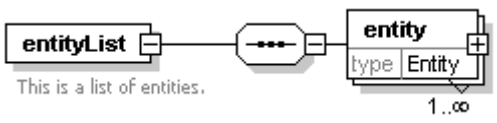
F.4. entityList.xsd

schema location: **entityList.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Elements
entityList

element **entityList**

diagram



properties content complex

children **entity**

annotation documentation This is a list of entities.

source

```
<xs:element name="entityList">
  <xs:annotation>
    <xs:documentation>This is a list of entities.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="entity" type="Entity" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

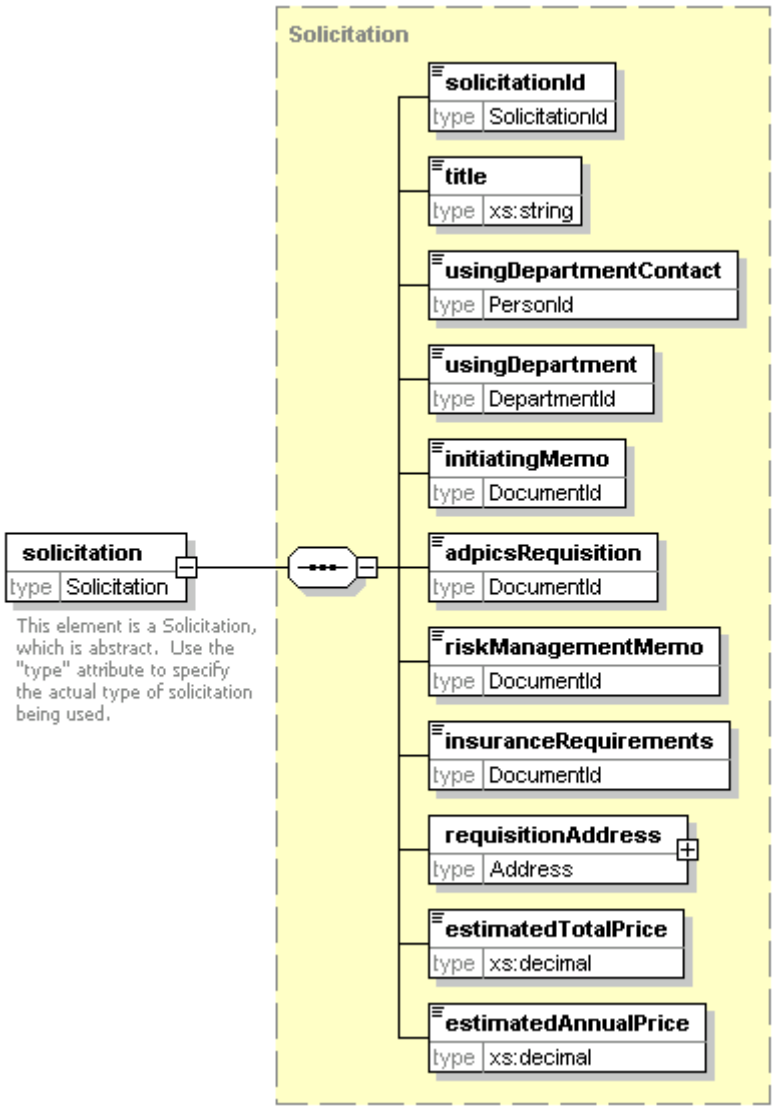
F.5. solicitation.xsd

schema location: **solicitation.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Elements
solicitation

element **solicitation**

diagram



type **Solicitation**

properties content complex

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice**

annotation documentation This element is a Solicitation, which is abstract. Use the "type" attribute to specify the actual type of solicitation being used.

source
```
<xs:element name="solicitation" type="Solicitation">
  <xs:annotation>
    <xs:documentation>This element is a Solicitation, which is abstract. Use the "type" attribute to specify the actual type of solicitation being used.</xs:documentation>
  </xs:annotation>
</xs:element>
```

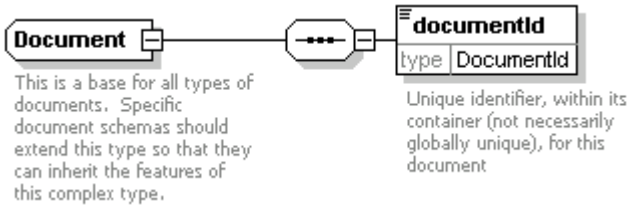
F.6. Types/Document.xsd

schema location: **types\Document.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
Document

complexType **Document**

diagram



properties abstract 1

children **documentId**

annotation documentation This is a base for all types of documents. Specific document schemas should extend this type so that they can inherit the features of this complex type.

source
```
<xs:complexType name="Document" abstract="1">
  <xs:annotation>
    <xs:documentation>This is a base for all types of documents. Specific document schemas should extend this type so that they can inherit the features of this complex type.</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="documentId" type="DocumentId">
      <xs:annotation>
        <xs:documentation>Unique identifier, within its container (not necessarily globally unique), for this document</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

element **Document/documentId**

diagram

type **DocumentId**

properties
isRef 0
content complex

annotation
documentation Unique identifier, within its container (not necessarily globally unique), for this document

source
```
<xs:element name="documentId" type="DocumentId">
  <xs:annotation>
    <xs:documentation>Unique identifier, within its container (not necessarily globally unique), for this
document</xs:documentation>
  </xs:annotation>
</xs:element>
```

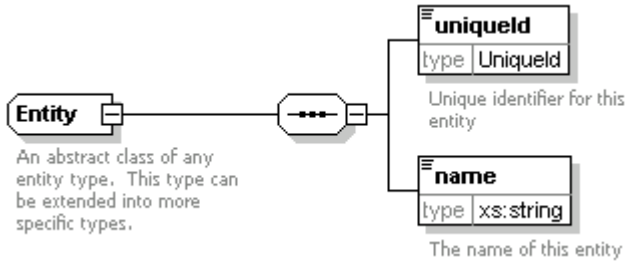
F.7. Types/Entity.xsd

schema location: **types\Entity.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
Entity

complexType **Entity**

diagram



properties
abstract true

children **uniqueId** **name**

annotation
documentation An abstract class of any entity type. This type can be extended into more specific types.

source
```
<xs:complexType name="Entity" abstract="true">
  <xs:annotation>
    <xs:documentation>An abstract class of any entity type.  This type can be extended into more specific
types.</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="uniqueId" type="UniqueId">
      <xs:annotation>
        <xs:documentation>Unique identifier for this entity</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="name" type="xs:string">
      <xs:annotation>
        <xs:documentation>The name of this entity</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

element **Entity/uniqueId**

diagram

type **UniqueId**

properties
isRef 0
content complex

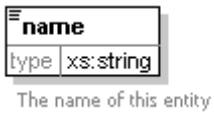
annotation
documentation Unique identifier for this entity

source

```
<xs:element name="uniqueId" type="UniqueId">
  <xs:annotation>
    <xs:documentation>Unique identifier for this entity</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **Entity/name**

diagram



type **xs:string**

properties
isRef 0
content simple

annotation
documentation The name of this entity

source

```
<xs:element name="name" type="xs:string">
  <xs:annotation>
    <xs:documentation>The name of this entity</xs:documentation>
  </xs:annotation>
</xs:element>
```

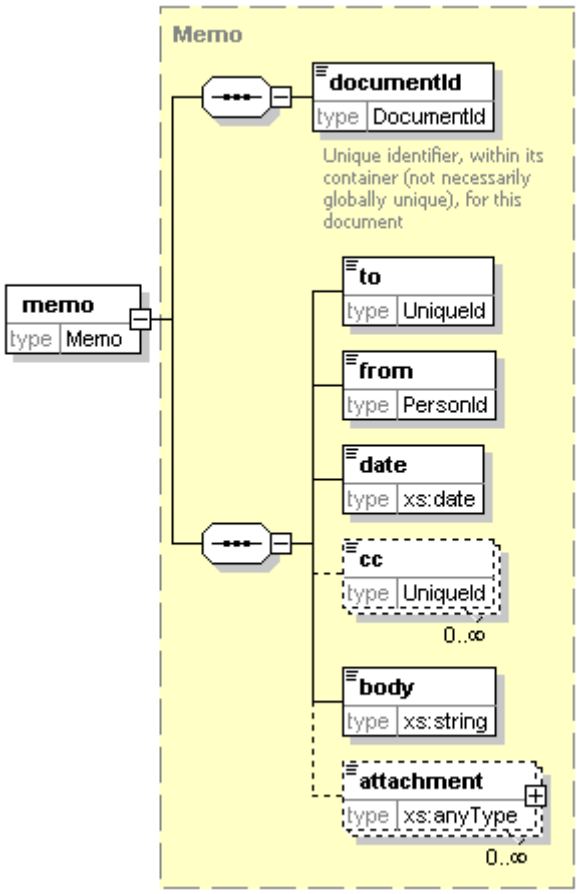
F.8. Types/Memo.xsd

schema location: **types\Memo.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Elements	Complex types
memo	**Memo**

element **memo**

diagram



type **Memo**

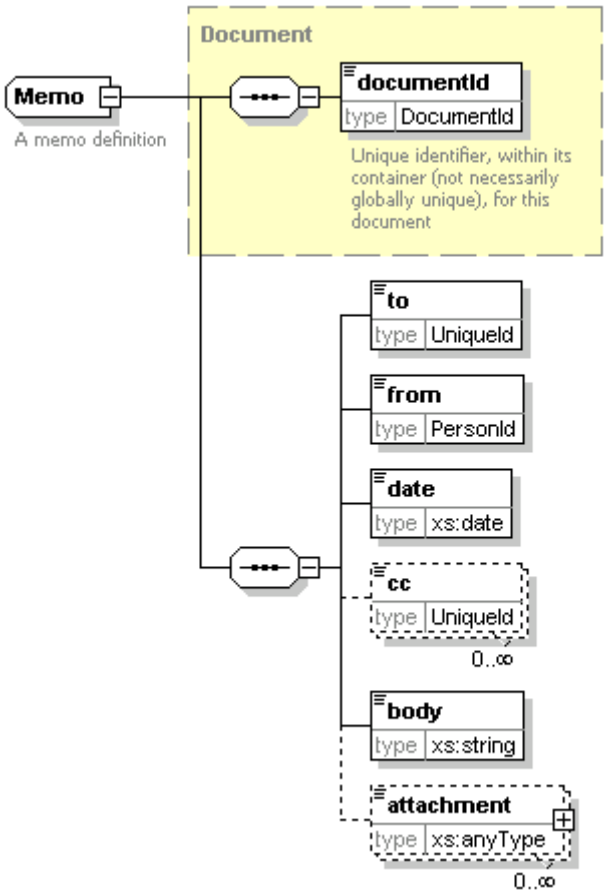
properties content complex

children **documentId** **to** **from** **date** **cc** **body** **attachment**

source <xs:element name="memo" type="Memo"/>

complexType **Memo**

diagram



type extension of **Document**

properties base Document

children **documentId** **to** **from** **date** **cc** **body** **attachment**

used by element **memo**

annotation documentation A memo definition

source

```
<xs:complexType name="Memo">
 <xs:annotation>
  <xs:documentation>A memo definition</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="to" type="UniqueId"/>
    <xs:element name="from" type="PersonId"/>
    <xs:element name="date" type="xs:date"/>
    <xs:element name="cc" type="UniqueId" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="body" type="xs:string"/>
    <xs:element name="attachment" type="xs:anyType" minOccurs="0" maxOccurs="unbounded"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **Memo/to**

diagram 

type **UniqueId**

properties
isRef 0
content complex

source
```
<xs:element name="to" type="UniqueId"/>
```

element **Memo/from**

diagram 

type **PersonId**

properties
isRef 0
content complex

source
```
<xs:element name="from" type="PersonId"/>
```

element **Memo/date**

diagram 

type **xs:date**

properties
isRef 0
content simple

source
```
<xs:element name="date" type="xs:date"/>
```

element **Memo/cc**

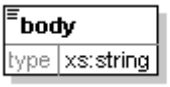
diagram 

type **UniqueId**

properties
isRef 0
content complex

source
```
<xs:element name="cc" type="UniqueId" minOccurs="0" maxOccurs="unbounded"/>
```

element **Memo/body**

diagram 

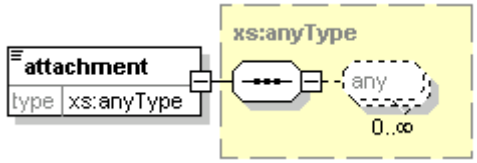
type **xs:string**

properties
isRef 0
content simple

source <xs:element name="body" type="xs:string"/>

element **Memo/attachment**

diagram



type **xs:anyType**

properties

isRef	0
content	complex
mixed	true

attributes

Name	Type	Use	Default	Fixed	Annotation

source <xs:element name="attachment" type="xs:anyType" minOccurs="0" maxOccurs="unbounded"/>

F.9. Types/SimpleTypes.xsd

schema location: **types\SimpleTypes.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types

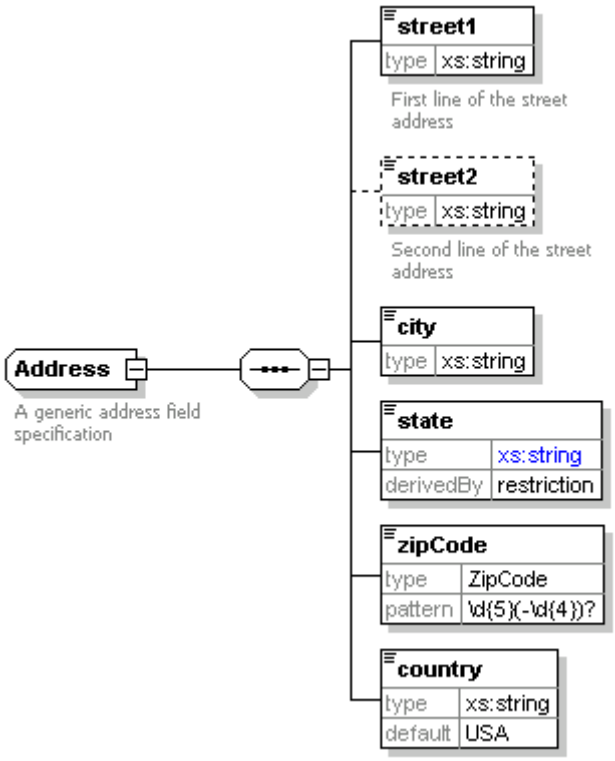
Address
Approval
DepartmentId
DocumentId
PersonId
PhoneNumber
PreSubmissionConference
SolicitationId
UniqueId
VendorId

Simple types

PhoneFormat
ZipCode

complexType **Address**

diagram



children **street1** **street2** **city** **state** **zipCode** **country**

used by element **PreSubmissionConference/address**

attributes

Name	Type	Use	Default	Fixed	Annotation
type	**xs:string**				documentation: indicates the type of address

annotation documentation A generic address field specification

source

```
<xs:complexType name="Address">
 <xs:annotation>
  <xs:documentation>A generic address field specification</xs:documentation>
 </xs:annotation>
 <xs:sequence>
  <xs:element name="street1" type="xs:string">
   <xs:annotation>
    <xs:documentation>First line of the street address</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="street2" type="xs:string" minOccurs="0">
   <xs:annotation>
    <xs:documentation>Second line of the street address</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="city" type="xs:string"/>
  <xs:element name="state">
   <xs:simpleType>
    <xs:restriction base="xs:string">
     <xs:enumeration value="AL"/>
     <xs:enumeration value="AK"/>
     <xs:enumeration value="AZ"/>
     <xs:enumeration value="AR"/>
```

```
            <xs:enumeration value="CA"/>
            <xs:enumeration value="CO"/>
            <xs:enumeration value="CT"/>
            <xs:enumeration value="DE"/>
            <xs:enumeration value="FL"/>
            <xs:enumeration value="GA"/>
            <xs:enumeration value="HI"/>
            <xs:enumeration value="ID"/>
            <xs:enumeration value="IL"/>
            <xs:enumeration value="IN"/>
            <xs:enumeration value="IA"/>
            <xs:enumeration value="KS"/>
            <xs:enumeration value="KY"/>
            <xs:enumeration value="LA"/>
            <xs:enumeration value="ME"/>
            <xs:enumeration value="MD"/>
            <xs:enumeration value="MA"/>
            <xs:enumeration value="MI"/>
            <xs:enumeration value="MN"/>
            <xs:enumeration value="MS"/>
            <xs:enumeration value="MO"/>
            <xs:enumeration value="MT"/>
            <xs:enumeration value="NB"/>
            <xs:enumeration value="NV"/>
            <xs:enumeration value="NH"/>
            <xs:enumeration value="NJ"/>
            <xs:enumeration value="NM"/>
            <xs:enumeration value="NY"/>
            <xs:enumeration value="NC"/>
            <xs:enumeration value="ND"/>
            <xs:enumeration value="OH"/>
            <xs:enumeration value="OK"/>
            <xs:enumeration value="OR"/>
            <xs:enumeration value="PN"/>
            <xs:enumeration value="RI"/>
            <xs:enumeration value="SC"/>
            <xs:enumeration value="SD"/>
            <xs:enumeration value="TN"/>
            <xs:enumeration value="TX"/>
            <xs:enumeration value="UT"/>
            <xs:enumeration value="VT"/>
            <xs:enumeration value="VA"/>
            <xs:enumeration value="WA"/>
            <xs:enumeration value="WV"/>
            <xs:enumeration value="WI"/>
            <xs:enumeration value="WY"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="zipCode" type="ZipCode"/>
      <xs:element name="country" type="xs:string" default="USA"/>
    </xs:sequence>
    <xs:attribute name="type" type="xs:string">
      <xs:annotation>
        <xs:documentation>indicates the type of address</xs:documentation>
      </xs:annotation>
    </xs:attribute>
  </xs:complexType>
```

element **Address/street1**

diagram

First line of the street address

type **xs:string**

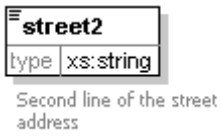
properties
- isRef 0
- content simple

annotation
- documentation First line of the street address

source
```
<xs:element name="street1" type="xs:string">
 <xs:annotation>
  <xs:documentation>First line of the street address</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **Address/street2**

diagram



type **xs:string**

properties
- isRef 0
- content simple

annotation
- documentation Second line of the street address

source
```
<xs:element name="street2" type="xs:string" minOccurs="0">
 <xs:annotation>
  <xs:documentation>Second line of the street address</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **Address/city**

diagram

type **xs:string**

properties
- isRef 0
- content simple

source
```
<xs:element name="city" type="xs:string"/>
```

element **Address/state**

diagram

type restriction of **xs:string**

properties
- isRef 0
- content simple

facets
- enumeration AL
- enumeration AK
- enumeration AZ
- enumeration AR
- enumeration CA
- enumeration CO
- enumeration CT
- enumeration DE
- enumeration FL

enumeration GA
enumeration HI
enumeration ID
enumeration IL
enumeration IN
enumeration IA
enumeration KS
enumeration KY
enumeration LA
enumeration ME
enumeration MD
enumeration MA
enumeration MI
enumeration MN
enumeration MS
enumeration MO
enumeration MT
enumeration NB
enumeration NV
enumeration NH
enumeration NJ
enumeration NM
enumeration NY
enumeration NC
enumeration ND
enumeration OH
enumeration OK
enumeration OR
enumeration PN
enumeration RI
enumeration SC
enumeration SD
enumeration TN
enumeration TX
enumeration UT
enumeration VT
enumeration VA
enumeration WA
enumeration WV
enumeration WI
enumeration WY

source

```
<xs:element name="state">
 <xs:simpleType>
  <xs:restriction base="xs:string">
   <xs:enumeration value="AL"/>
   <xs:enumeration value="AK"/>
   <xs:enumeration value="AZ"/>
   <xs:enumeration value="AR"/>
   <xs:enumeration value="CA"/>
   <xs:enumeration value="CO"/>
   <xs:enumeration value="CT"/>
   <xs:enumeration value="DE"/>
   <xs:enumeration value="FL"/>
   <xs:enumeration value="GA"/>
   <xs:enumeration value="HI"/>
   <xs:enumeration value="ID"/>
   <xs:enumeration value="IL"/>
   <xs:enumeration value="IN"/>
   <xs:enumeration value="IA"/>
   <xs:enumeration value="KS"/>
   <xs:enumeration value="KY"/>
   <xs:enumeration value="LA"/>
   <xs:enumeration value="ME"/>
   <xs:enumeration value="MD"/>
   <xs:enumeration value="MA"/>
   <xs:enumeration value="MI"/>
   <xs:enumeration value="MN"/>
   <xs:enumeration value="MS"/>
   <xs:enumeration value="MO"/>
   <xs:enumeration value="MT"/>
```

```
      <xs:enumeration value="NB"/>
      <xs:enumeration value="NV"/>
      <xs:enumeration value="NH"/>
      <xs:enumeration value="NJ"/>
      <xs:enumeration value="NM"/>
      <xs:enumeration value="NY"/>
      <xs:enumeration value="NC"/>
      <xs:enumeration value="ND"/>
      <xs:enumeration value="OH"/>
      <xs:enumeration value="OK"/>
      <xs:enumeration value="OR"/>
      <xs:enumeration value="PN"/>
      <xs:enumeration value="RI"/>
      <xs:enumeration value="SC"/>
      <xs:enumeration value="SD"/>
      <xs:enumeration value="TN"/>
      <xs:enumeration value="TX"/>
      <xs:enumeration value="UT"/>
      <xs:enumeration value="VT"/>
      <xs:enumeration value="VA"/>
      <xs:enumeration value="WA"/>
      <xs:enumeration value="WV"/>
      <xs:enumeration value="WI"/>
      <xs:enumeration value="WY"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```

element **Address/zipCode**

diagram

type **ZipCode**

properties
- isRef 0
- content simple

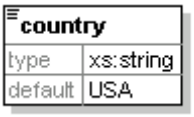
facets
- pattern \d{5}(-\d{4})?

source

```
<xs:element name="zipCode" type="ZipCode"/>
```

element **Address/country**

diagram



type **xs:string**

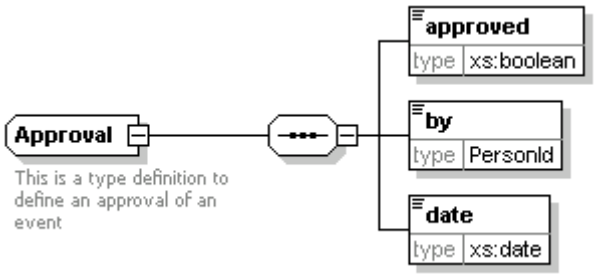
properties
- isRef 0
- content simple
- default USA

source

```
<xs:element name="country" type="xs:string" default="USA"/>
```

complexType **Approval**

diagram



children **approved** **by** **date**

annotation
documentation This is a type definition to define an approval of an event

source

```
<xs:complexType name="Approval">
  <xs:annotation>
    <xs:documentation>This is a type definition to define an approval of an event</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="approved" type="xs:boolean"/>
    <xs:element name="by" type="PersonId"/>
    <xs:element name="date" type="xs:date"/>
  </xs:sequence>
</xs:complexType>
```

element **Approval/approved**

diagram

type **xs:boolean**

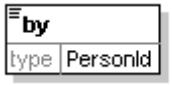
properties
isRef 0
content simple

source

```
<xs:element name="approved" type="xs:boolean"/>
```

element **Approval/by**

diagram



type **PersonId**

properties
isRef 0
content complex

source

```
<xs:element name="by" type="PersonId"/>
```

element **Approval/date**

diagram

type **xs:date**

properties
isRef 0
content simple

source
```
<xs:element name="date" type="xs:date"/>
```

complexType **DepartmentId**

diagram

type extension of **UniqueId**

properties
base UniqueId

annotation
documentation A unique identifier for departments

source
```
<xs:complexType name="DepartmentId">
 <xs:annotation>
  <xs:documentation>A unique identifier for departments</xs:documentation>
 </xs:annotation>
 <xs:simpleContent>
  <xs:extension base="UniqueId"/>
 </xs:simpleContent>
</xs:complexType>
```

complexType **DocumentId**

diagram

type extension of **UniqueId**

properties
base UniqueId

annotation
documentation A non-globally unique identifier for a document (only unique within a solicitation)

source
```
<xs:complexType name="DocumentId">
 <xs:annotation>
  <xs:documentation>A non-globally unique identifier for a document (only unique within a solicitation)</xs:documentation>
 </xs:annotation>
 <xs:simpleContent>
  <xs:extension base="UniqueId"/>
 </xs:simpleContent>
</xs:complexType>
```

complexType **PersonId**

diagram

type extension of **UniqueId**

properties
base UniqueId

used by
element **Approval/by**

annotation
documentation A unique identifier for a person

source

```
<xs:complexType name="PersonId">
 <xs:annotation>
  <xs:documentation>A unique identifier for a person</xs:documentation>
 </xs:annotation>
 <xs:simpleContent>
  <xs:extension base="UniqueId"/>
 </xs:simpleContent>
</xs:complexType>
```

complexType **PhoneNumber**

diagram

type extension of **PhoneFormat**

properties
- base PhoneFormat

facets
- pattern \d{3}-\d{3}-\d{4}(x\W{2,6})?

attributes

Name	Type	Use	Default	Fixed	Annotation
type		optional			documentation: type of phone number, such as fax, mobile, etc.

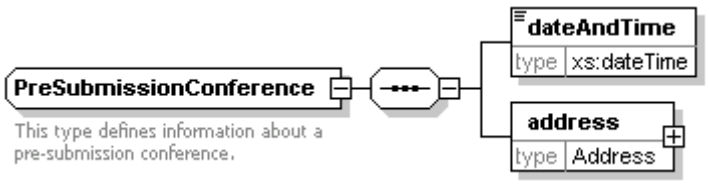
annotation
- documentation A complex phone number field with a type attribute.

source

```
<xs:complexType name="PhoneNumber">
 <xs:annotation>
  <xs:documentation>A complex phone number field with a type attribute.</xs:documentation>
 </xs:annotation>
 <xs:simpleContent>
  <xs:extension base="PhoneFormat">
   <xs:attribute name="type" use="optional">
    <xs:annotation>
     <xs:documentation>type of phone number, such as fax, mobile, etc.</xs:documentation>
    </xs:annotation>
   </xs:attribute>
  </xs:extension>
 </xs:simpleContent>
</xs:complexType>
```

complexType **PreSubmissionConference**

diagram



children **dateAndTime** **address**

annotation
- documentation This type defines information about a pre-submission conference.

source

```
<xs:complexType name="PreSubmissionConference">
```

```
<xs:annotation>
  <xs:documentation>This type defines information about a pre-submission conference.</xs:documentation>
</xs:annotation>
<xs:sequence>
  <xs:element name="dateAndTime" type="xs:dateTime"/>
  <xs:element name="address" type="Address"/>
</xs:sequence>
</xs:complexType>
```

element **PreSubmissionConference/dateAndTime**

diagram

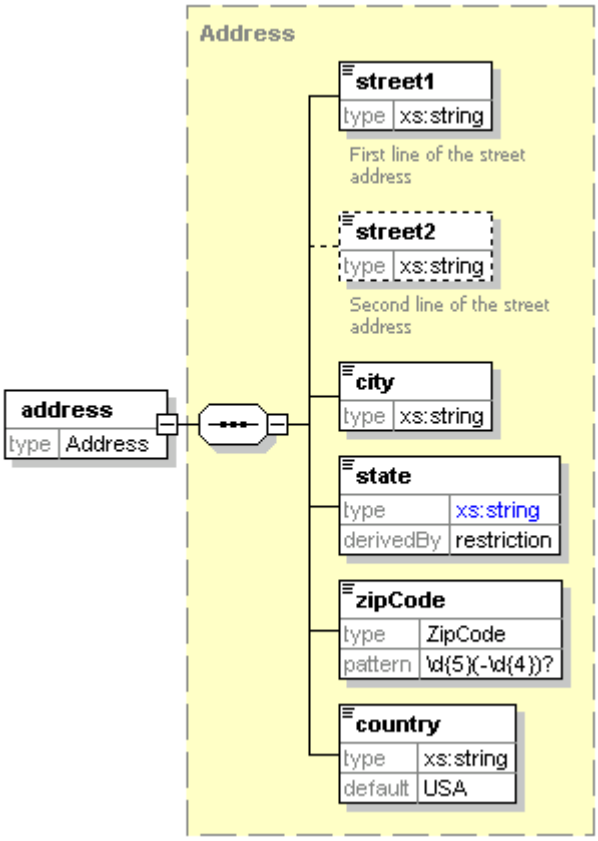
type **xs:dateTime**

properties
- isRef 0
- content simple

source
```
<xs:element name="dateAndTime" type="xs:dateTime"/>
```

element **PreSubmissionConference/address**

diagram



type **Address**

properties
- isRef 0
- content complex

children **street1** **street2** **city** **state** **zipCode** **country**

attributes

Name	Type	Use	Default	Fixed	Annotation
type	**xs:string**				docu indica

ment tes
ation the
type
of
addre
ss

source
```
<xs:element name="address" type="Address"/>
```

complexType **SolicitationId**

diagram

type extension of **UniqueId**

properties
- base UniqueId

annotation
- documentation A unique identifier for a solicitation

source
```
<xs:complexType name="SolicitationId">
 <xs:annotation>
  <xs:documentation>A unique identifier for a solicitation</xs:documentation>
 </xs:annotation>
 <xs:simpleContent>
  <xs:extension base="UniqueId"/>
 </xs:simpleContent>
</xs:complexType>
```

complexType **UniqueId**

diagram

type extension of **xs:string**

properties
- base xs:string
- abstract true

used by
- complexTypes **DepartmentId** **DocumentId** **PersonId** **SolicitationId** **VendorId**

annotation
- documentation This is a unified type for describing a unique ID field.

source
```
<xs:complexType name="UniqueId" abstract="true">
 <xs:annotation>
  <xs:documentation>This is a unified type for describing a unique ID field.</xs:documentation>
 </xs:annotation>
 <xs:simpleContent>
  <xs:extension base="xs:string"/>
 </xs:simpleContent>
</xs:complexType>
```

complexType **VendorId**

diagram

type extension of **UniqueId**

properties
- base UniqueId

annotation documentation A unique identifier for vendors

source
```
<xs:complexType name="VendorId">
  <xs:annotation>
    <xs:documentation>A unique identifier for vendors</xs:documentation>
  </xs:annotation>
  <xs:simpleContent>
    <xs:extension base="UniqueId"/>
  </xs:simpleContent>
</xs:complexType>
```

simpleType **PhoneFormat**

type restriction of **xs:string**

used by complexType **PhoneNumber**

facets pattern \d{3}-\d{3}-\d{4}(x\W{2,6})?

annotation documentation A generic phone number field in the format ###-###-####

source
```
<xs:simpleType name="PhoneFormat">
  <xs:annotation>
    <xs:documentation>A generic phone number field in the format ###-###-####</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:pattern value="\d{3}-\d{3}-\d{4}(x\W{2,6})?"/>
  </xs:restriction>
</xs:simpleType>
```

simpleType **ZipCode**

type restriction of **xs:string**

used by element **Address/zipCode**

facets pattern \d{5}(-\d{4})?

annotation documentation A 5-digit postal code with format #####-#### where the ending -#### is optional.

source
```
<xs:simpleType name="ZipCode">
  <xs:annotation>
    <xs:documentation>A 5-digit postal code with format #####-#### where the ending -#### is optional.</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:pattern value="\d{5}(-\d{4})?"/>
  </xs:restriction>
</xs:simpleType>
```

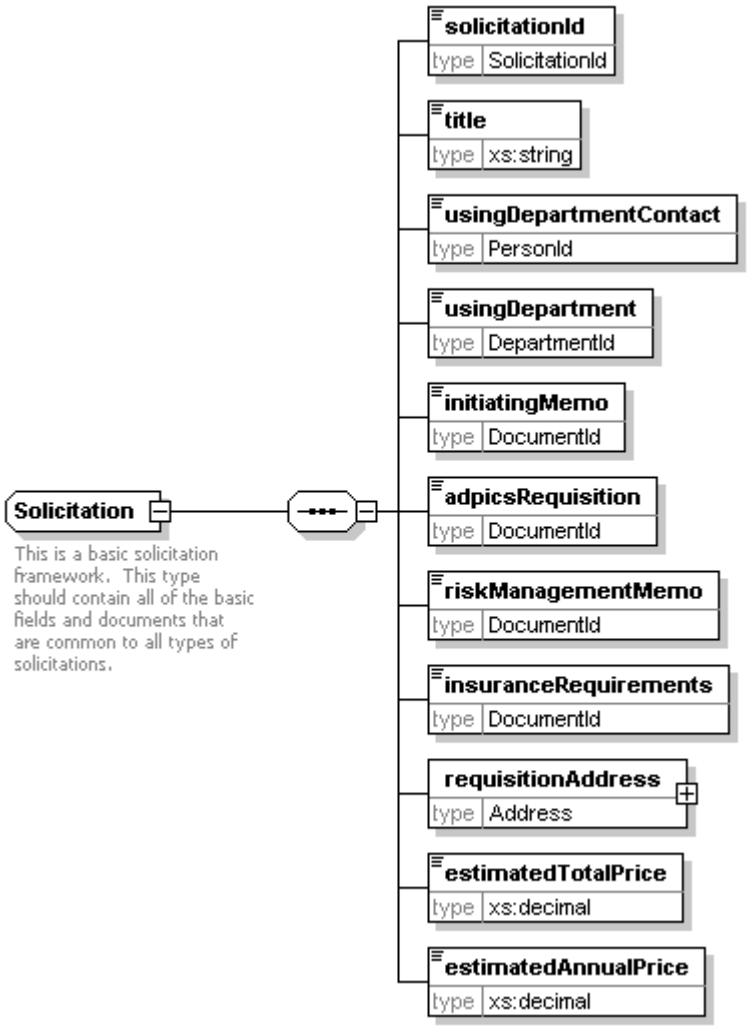
F.10. Types/Solicitation.xsd

schema location: **types\Solicitation.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
Solicitation

complexType **Solicitation**

diagram



properties abstract 1

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice**

annotation documentation This is a basic solicitation framework. This type should contain all of the basic fields and documents that are common to all types of solicitations.

source

```
<xs:complexType name="Solicitation" abstract="1">
 <xs:annotation>
  <xs:documentation>This is a basic solicitation framework.  This type should contain all of the basic fields and documents that are common to all types of solicitations.</xs:documentation>
 </xs:annotation>
 <xs:sequence>
  <xs:element name="solicitationId" type="SolicitationId"/>
  <xs:element name="title" type="xs:string"/>
  <xs:element name="usingDepartmentContact" type="PersonId"/>
  <xs:element name="usingDepartment" type="DepartmentId"/>
  <xs:element name="initiatingMemo" type="DocumentId"/>
  <xs:element name="adpicsRequisition" type="DocumentId"/>
  <xs:element name="riskManagementMemo" type="DocumentId"/>
  <xs:element name="insuranceRequirements" type="DocumentId"/>
  <xs:element name="requisitionAddress" type="Address"/>
  <xs:element name="estimatedTotalPrice" type="xs:decimal"/>
  <xs:element name="estimatedAnnualPrice" type="xs:decimal"/>
 </xs:sequence>
```

```
</xs:complexType>
```

element **Solicitation/solicitationId**

diagram

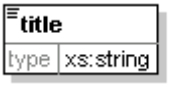
type **SolicitationId**

properties
- isRef 0
- content complex

source
```
<xs:element name="solicitationId" type="SolicitationId"/>
```

element **Solicitation/title**

diagram



type **xs:string**

properties
- isRef 0
- content simple

source
```
<xs:element name="title" type="xs:string"/>
```

element **Solicitation/usingDepartmentContact**

diagram

type **PersonId**

properties
- isRef 0
- content complex

source
```
<xs:element name="usingDepartmentContact" type="PersonId"/>
```

element **Solicitation/usingDepartment**

diagram

type **DepartmentId**

properties
- isRef 0
- content complex

source
```
<xs:element name="usingDepartment" type="DepartmentId"/>
```

element **Solicitation/initiatingMemo**

diagram

type **DocumentId**

properties
- isRef 0

content complex

source <xs:element name="initiatingMemo" type="DocumentId"/>

element **Solicitation/adpicsRequisition**

diagram 

type **DocumentId**

properties isRef 0
content complex

source <xs:element name="adpicsRequisition" type="DocumentId"/>

element **Solicitation/riskManagementMemo**

diagram 

type **DocumentId**

properties isRef 0
content complex

source <xs:element name="riskManagementMemo" type="DocumentId"/>

element **Solicitation/insuranceRequirements**

diagram 

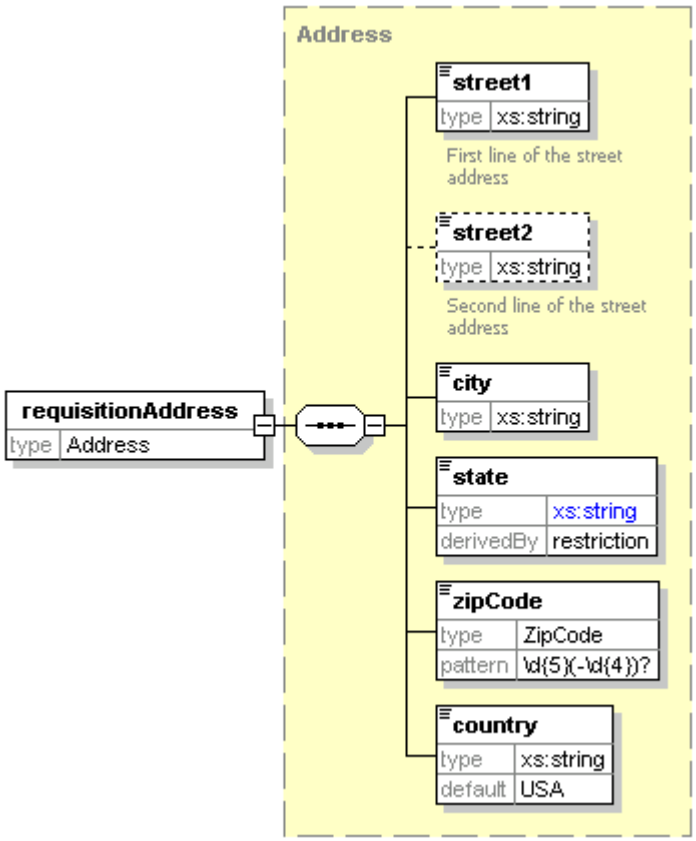
type **DocumentId**

properties isRef 0
content complex

source <xs:element name="insuranceRequirements" type="DocumentId"/>

element **Solicitation/requisitionAddress**

diagram



type **Address**

properties
- isRef 0
- content complex

children **street1** **street2** **city** **state** **zipCode** **country**

attributes

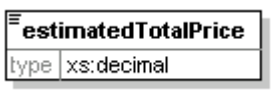
Name	Type	Use	Default	Fixed	Annotation
type	**xs:string**				documentation: indicates the type of address

source

```
<xs:element name="requisitionAddress" type="Address"/>
```

element **Solicitation/estimatedTotalPrice**

diagram



type **xs:decimal**

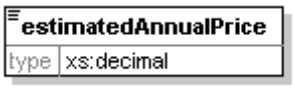
properties
- isRef 0
- content simple

source

```
<xs:element name="estimatedTotalPrice" type="xs:decimal"/>
```

element **Solicitation/estimatedAnnualPrice**

diagram



type **xs:decimal**

properties
- isRef 0
- content simple

source
```
<xs:element name="estimatedAnnualPrice" type="xs:decimal"/>
```

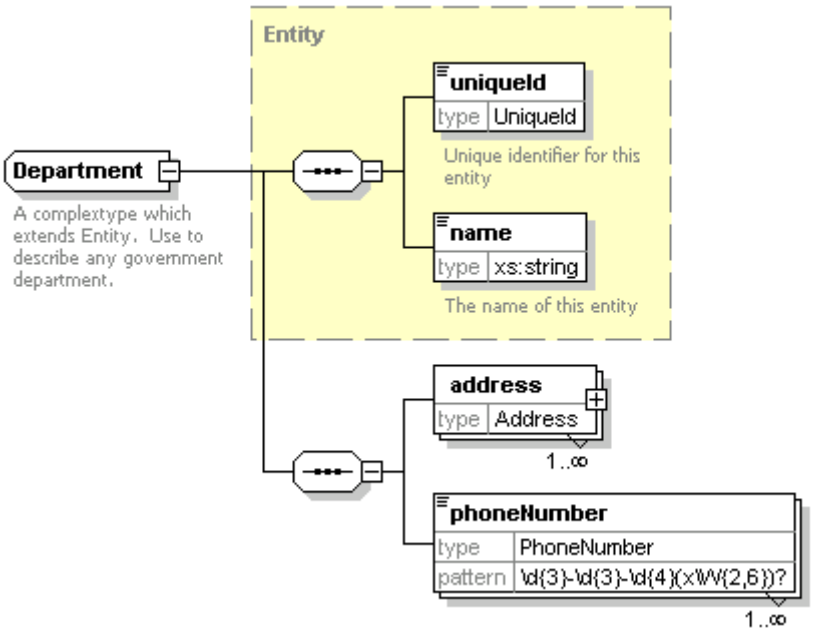
F.11. Types/Entities/Department.xsd

schema location: types\entities\Department.xsd
attribute form default: **unqualified**
element form default: **qualified**

Complex types
Department

complexType **Department**

diagram



type extension of **Entity**

properties
- base Entity

children **uniqueId** **name** **address** **phoneNumber**

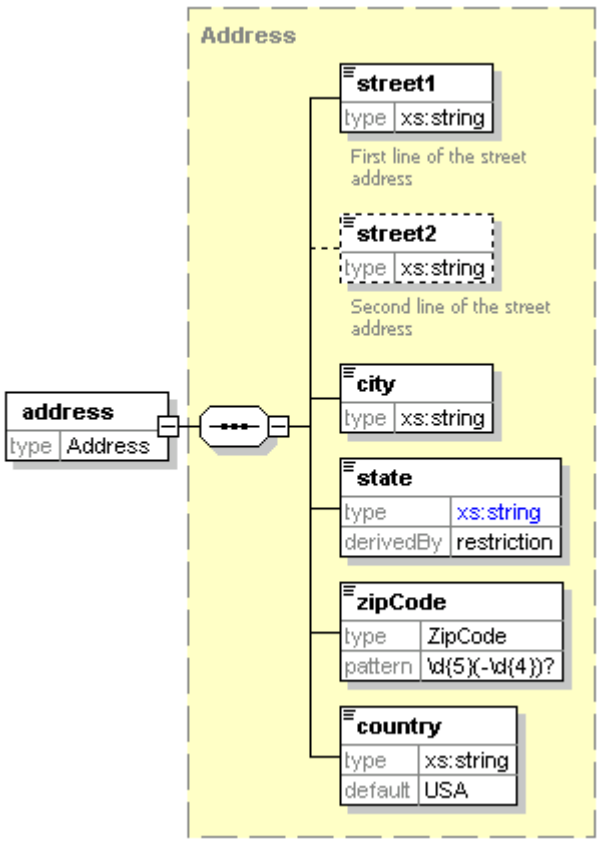
annotation
- documentation A complextype which extends Entity. Use to describe any government department.

source
```
<xs:complexType name="Department">
  <xs:annotation>
```

```
    <xs:documentation>A complextype which extends Entity.  Use to describe any government
department.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="Entity">
      <xs:sequence>
        <xs:element name="address" type="Address" maxOccurs="unbounded"/>
        <xs:element name="phoneNumber" type="PhoneNumber" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

element **Department/address**

diagram



type **Address**

properties
- isRef 0
- content complex

children **street1** **street2** **city** **state** **zipCode** **country**

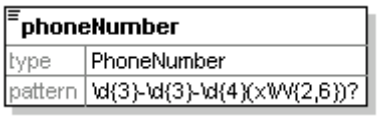
attributes

Name	Type	Use	Default	Fixed	Annotation
type	**xs:string**				documentation: indicates the type of address

source
```
<xs:element name="address" type="Address" maxOccurs="unbounded"/>
```

element **Department/phoneNumber**

diagram



type **PhoneNumber**

properties
- isRef 0
- content complex
- pattern \d{3}-\d{3}-\d{4}(x\W{2,6})?

facets

attributes

Name	Type	Use	Default	Fixed	Annotation
type		optional			documentation: type of phone number, such as fax, mobile, etc.

source
```
<xs:element name="phoneNumber" type="PhoneNumber" maxOccurs="unbounded"/>
```

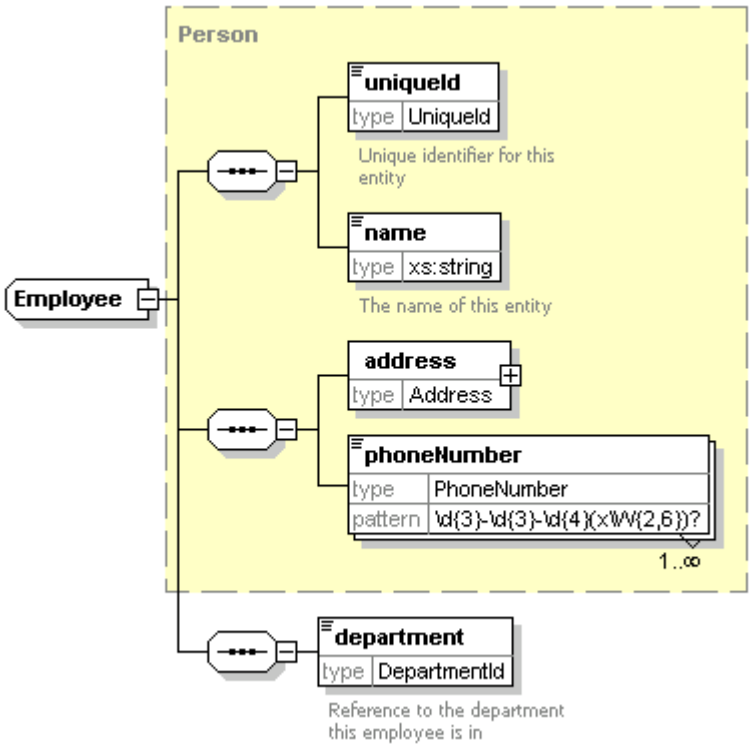
F.12. Types/Entities/Employee.xsd

schema location: **types\entities\Employee.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
Employee

complexType **Employee**

diagram



type extension of **Person**

properties
base Person

children **uniqueId** **name** **address** **phoneNumber** **department**

source

```
<xs:complexType name="Employee">
  <xs:complexContent>
    <xs:extension base="Person">
      <xs:sequence>
        <xs:element name="department" type="DepartmentId">
          <xs:annotation>
            <xs:documentation>Reference to the department this employee is in</xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

element **Employee/department**

diagram

type **DepartmentId**

properties
isRef 0
content complex

annotation
documentation Reference to the department this employee is in

source

```
<xs:element name="department" type="DepartmentId">
```

```
  <xs:annotation>
    <xs:documentation>Reference to the department this employee is in</xs:documentation>
  </xs:annotation>
</xs:element>
```

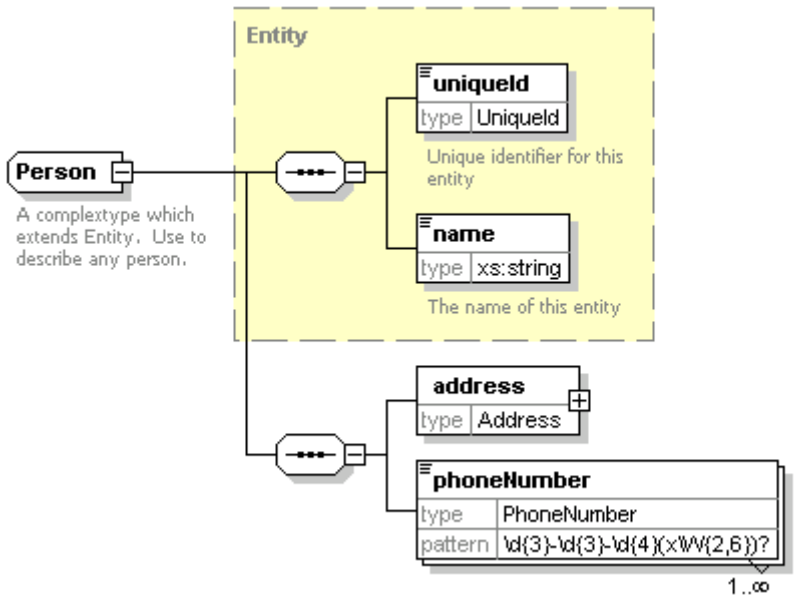
F.13. Types/Entities/Person.xsd

schema location: **types\entities\Person.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
Person

complexType **Person**

diagram



type extension of **Entity**

properties
base Entity

children **uniqueId** **name** **address** **phoneNumber**

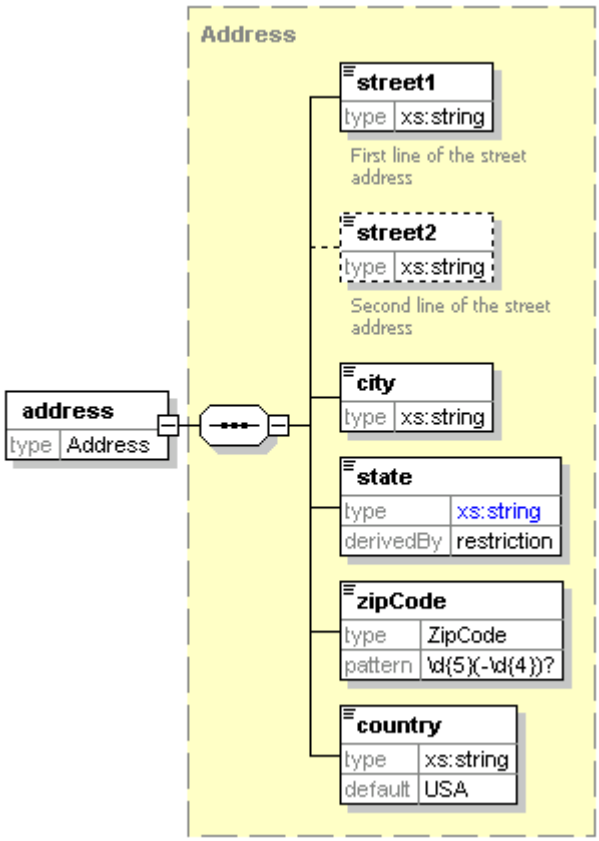
annotation
documentation A complextype which extends Entity. Use to describe any person.

source

```
<xs:complexType name="Person">
  <xs:annotation>
    <xs:documentation>A complextype which extends Entity.  Use to describe any person.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="Entity">
      <xs:sequence>
        <xs:element name="address" type="Address"/>
        <xs:element name="phoneNumber" type="PhoneNumber" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

element **Person/address**

diagram



type **Address**

properties
- isRef 0
- content complex

children **street1** **street2** **city** **state** **zipCode** **country**

attributes

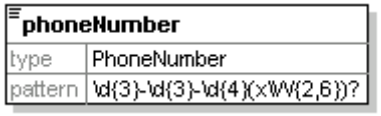
Name	Type	Use	Default	Fixed	Annotation
type	**xs:string**				documentation: indicates the type of address

source

```
<xs:element name="address" type="Address"/>
```

element **Person/phoneNumber**

diagram



type **PhoneNumber**

properties
- isRef 0
- content complex

facets
- pattern \d{3}-\d{3}-\d{4}(x\W{2,6})?

attributes	Name	Type	Use	Default	Fixed	Annotation
	type		optional			documentation: type of phone number, such as fax, mobile, etc.

source
```
<xs:element name="phoneNumber" type="PhoneNumber" maxOccurs="unbounded"/>
```

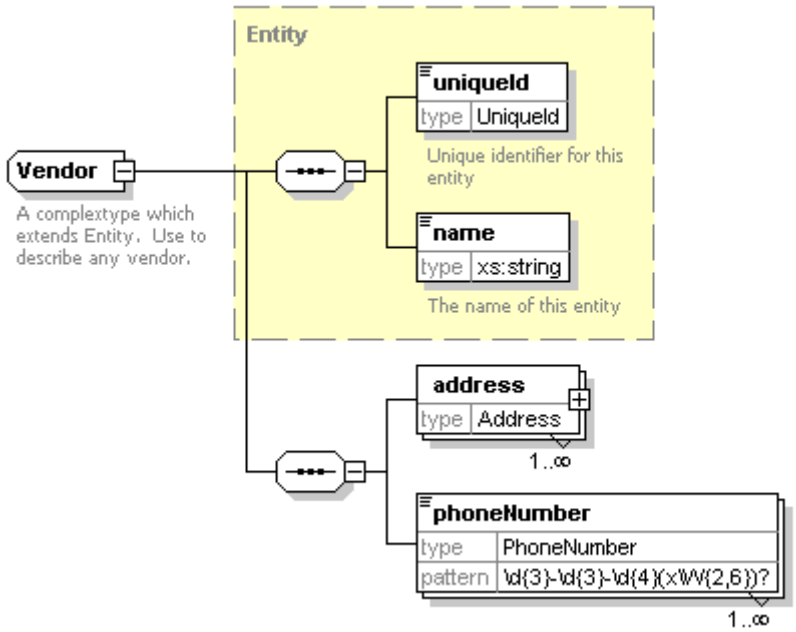
F.14. Types/Entities/Vendor.xsd

schema location: **types\entities\Vendor.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
Vendor

complexType **Vendor**

diagram



type extension of **Entity**

properties
base Entity

children **uniqueId** **name** **address** **phoneNumber**

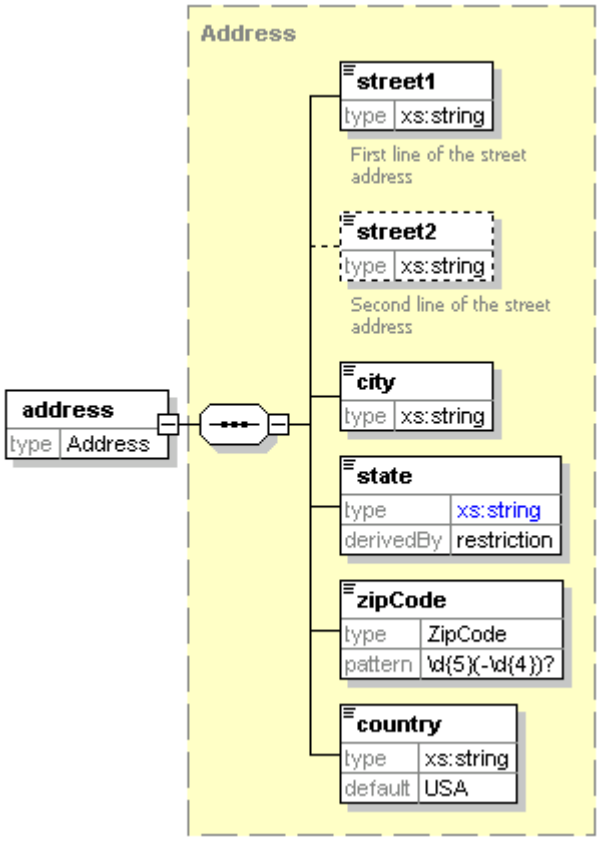
annotation
documentation A complextype which extends Entity. Use to describe any vendor.

source
```
<xs:complexType name="Vendor">
  <xs:annotation>
```

```
    <xs:documentation>A complextype which extends Entity.  Use to describe any vendor.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="Entity">
      <xs:sequence>
        <xs:element name="address" type="Address" maxOccurs="unbounded"/>
        <xs:element name="phoneNumber" type="PhoneNumber" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

element **Vendor/address**

diagram



type **Address**

properties
- isRef 0
- content complex

children **street1** **street2** **city** **state** **zipCode** **country**

attributes

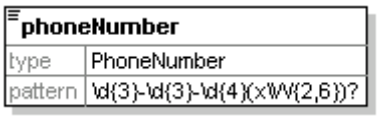
Name	Type	Use	Default	Fixed	Annotation
type	**xs:string**				documentation: indicates the type of address

source

```
<xs:element name="address" type="Address" maxOccurs="unbounded"/>
```

element **Vendor/phoneNumber**

diagram



type **PhoneNumber**

properties
- isRef 0
- content complex
- pattern \d{3}-\d{3}-\d{4}(x\W{2,6})?

facets

attributes

Name	Type	Use	Default	Fixed	Annotation
type		optional			documentation: type of phone number, such as fax, mobile, etc.

source `<xs:element name="phoneNumber" type="PhoneNumber" maxOccurs="unbounded"/>`

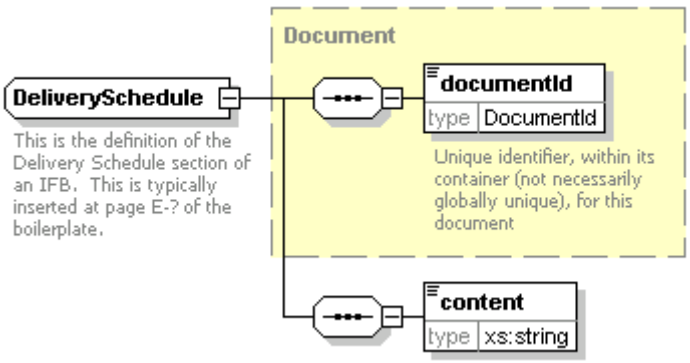
F.15. Types/IFBDocuments/DeliverySchedule.xsd

schema location: **types\IFBDocuments\DeliverySchedule.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
DeliverySchedule

complexType **DeliverySchedule**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **content**

annotation
- documentation This is the definition of the Delivery Schedule section of an IFB. This is typically inserted at page E-? of

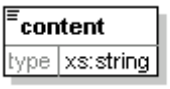
the boilerplate.

source

```
<xs:complexType name="DeliverySchedule">
  <xs:annotation>
    <xs:documentation>This is the definition of the Delivery Schedule section of an IFB.  This is typically inserted at page E-? of the boilerplate.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="Document">
      <xs:sequence>
        <xs:element name="content" type="xs:string"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

element **DeliverySchedule/content**

diagram



type **xs:string**

properties
- isRef 0
- content simple

source

```
<xs:element name="content" type="xs:string"/>
```

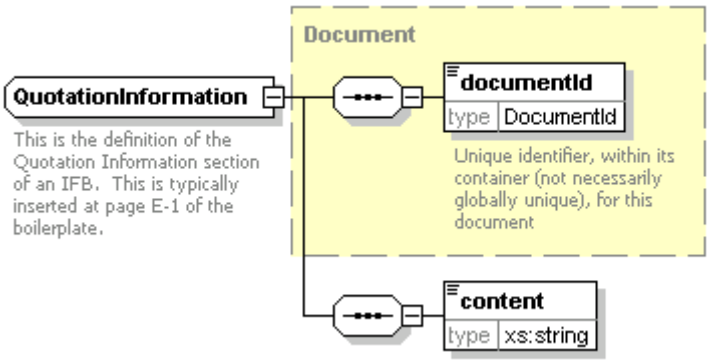
F.16. Types/IFBDocuments/QuotationInformation.xsd

schema location: types\IFBDocuments\QuotationInformation.xsd
attribute form default: **unqualified**
element form default: **qualified**

Complex types
QuotationInformation

complexType **QuotationInformation**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **content**

annotation
- documentation This is the definition of the Quotation Information section of an IFB. This is typically inserted at page E-

1 of the boilerplate.

source
```
<xs:complexType name="QuotationInformation">
 <xs:annotation>
  <xs:documentation>This is the definition of the Quotation Information section of an IFB.  This is typically inserted at page E-1 of the boilerplate.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="content" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **QuotationInformation/content**

diagram

type **xs:string**

properties
- isRef 0
- content simple

source
```
<xs:element name="content" type="xs:string"/>
```

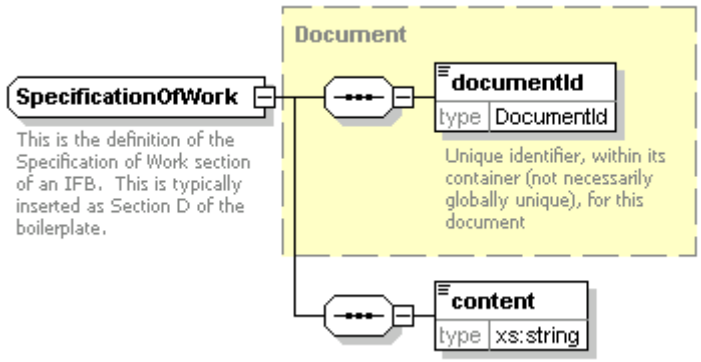
F.17. Types/IFBDocuments/SpecificationOfWork.xsd

schema location: **types\IFBDocuments\SpecificationOfWork.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
SpecificationOfWork

complexType **SpecificationOfWork**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **content**

annotation documentation This is the definition of the Specification of Work section of an IFB. This is typically inserted as Section D of the boilerplate.

source
```
<xs:complexType name="SpecificationOfWork">
 <xs:annotation>
  <xs:documentation>This is the definition of the Specification of Work section of an IFB. This is typically inserted as Section D of the boilerplate.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="content" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **SpecificationOfWork/content**

diagram

type **xs:string**

properties
isRef 0
content simple

source
```
<xs:element name="content" type="xs:string"/>
```

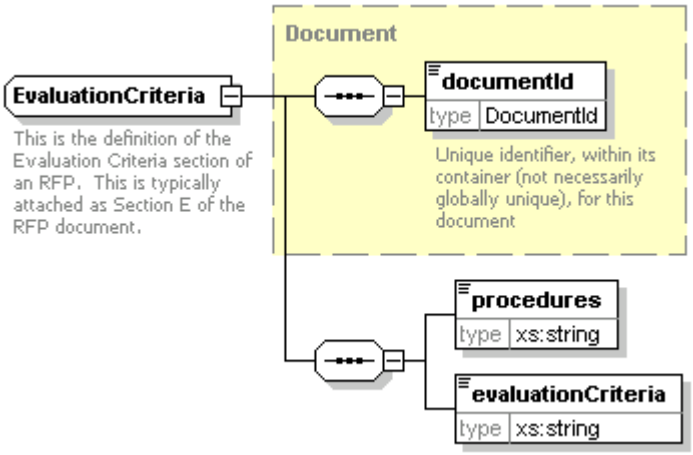
F.18. Types/RFPDocuments/EvaluationCriteria.xsd

schema location: types\RFPDocuments\EvaluationCriteria.xsd
attribute form default: **unqualified**
element form default: **qualified**

Complex types
EvaluationCriteria

complexType **EvaluationCriteria**

diagram



type extension of Document

properties base Document

children **documentId** **procedures** **evaluationCriteria**

annotation documentation This is the definition of the Evaluation Criteria section of an RFP. This is typically attached as Section E of the RFP document.

source

```
<xs:complexType name="EvaluationCriteria">
 <xs:annotation>
  <xs:documentation>This is the definition of the Evaluation Criteria section of an RFP.  This is typically attached as Section E of the RFP document.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="procedures" type="xs:string"/>
    <xs:element name="evaluationCriteria" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **EvaluationCriteria/procedures**

diagram

type **xs:string**

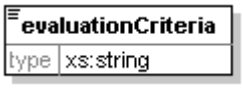
properties isRef 0
content simple

source

```
<xs:element name="procedures" type="xs:string"/>
```

element **EvaluationCriteria/evaluationCriteria**

diagram



type **xs:string**

properties isRef 0
content simple

source

```
<xs:element name="evaluationCriteria" type="xs:string"/>
```

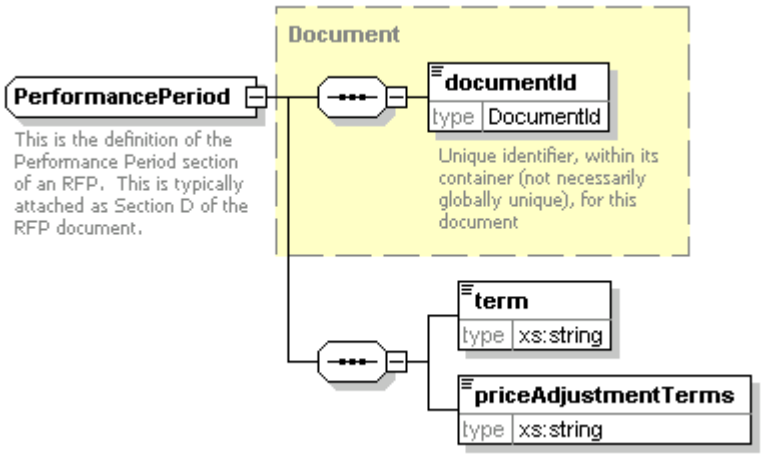
F.19. Types/RFPDocuments/PerformancePeriod.xsd

schema location: **types\RFPDocuments\PerformancePeriod.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
PerformancePeriod

complexType **PerformancePeriod**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **term** **priceAdjustmentTerms**

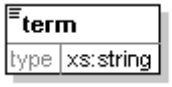
annotation
- documentation This is the definition of the Performance Period section of an RFP. This is typically attached as Section D of the RFP document.

source

```
<xs:complexType name="PerformancePeriod">
 <xs:annotation>
  <xs:documentation>This is the definition of the Performance Period section of an RFP.  This is typically attached as Section D of the RFP document.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="term" type="xs:string"/>
    <xs:element name="priceAdjustmentTerms" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **PerformancePeriod/term**

diagram



type **xs:string**

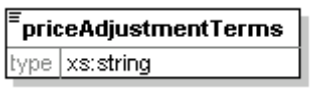
properties
- isRef 0
- content simple

source

```
<xs:element name="term" type="xs:string"/>
```

element **PerformancePeriod/priceAdjustmentTerms**

diagram



type **xs:string**

properties
- isRef 0
- content simple

source <xs:element name="priceAdjustmentTerms" type="xs:string"/>

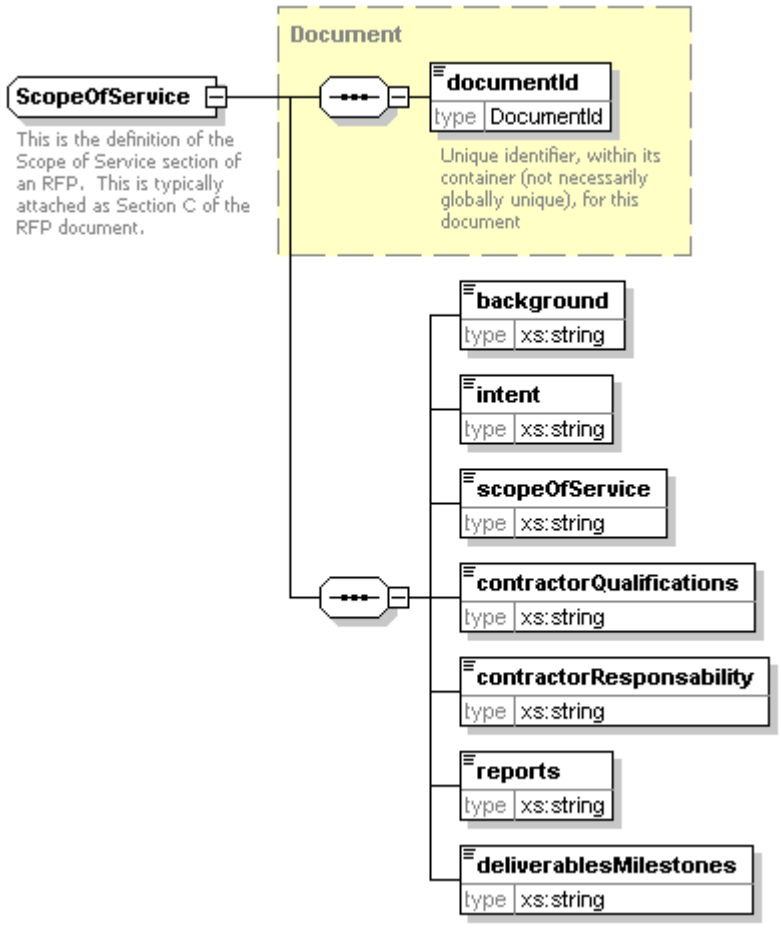
F.20. Types/RFPDocuments/ScopeOfService.xsd

schema location: types\RFPDocuments\ScopeOfService.xsd
attribute form default: **unqualified**
element form default: **qualified**

Complex types
ScopeOfService

complexType **ScopeOfService**

diagram



type extension of **Document**

properties base Document

children **documentId** **background** **intent** **scopeOfService** **contractorQualifications** **contractorResponsability** **reports** **deliverablesMilestones**

annotation documentation This is the definition of the Scope of Service section of an RFP. This is typically attached as Section C of the RFP document.

source

```
<xs:complexType name="ScopeOfService">
 <xs:annotation>
  <xs:documentation>This is the definition of the Scope of Service section of an RFP.  This is typically attached as Section C of the RFP document.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="background" type="xs:string"/>
    <xs:element name="intent" type="xs:string"/>
    <xs:element name="scopeOfService" type="xs:string"/>
    <xs:element name="contractorQualifications" type="xs:string"/>
    <xs:element name="contractorResponsability" type="xs:string"/>
    <xs:element name="reports" type="xs:string"/>
    <xs:element name="deliverablesMilestones" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **ScopeOfService/background**

diagram

type **xs:string**

properties

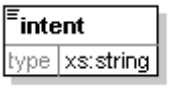
isRef	0
content	simple

source

```
<xs:element name="background" type="xs:string"/>
```

element **ScopeOfService/intent**

diagram



type **xs:string**

properties

isRef	0
content	simple

source

```
<xs:element name="intent" type="xs:string"/>
```

element **ScopeOfService/scopeOfService**

diagram

type **xs:string**

properties

isRef	0
content	simple

source

```
<xs:element name="scopeOfService" type="xs:string"/>
```

element **ScopeOfService/contractorQualifications**

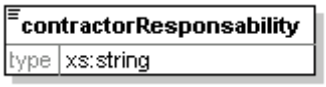
diagram 

type **xs:string**

properties
isRef 0
content simple

source
```
<xs:element name="contractorQualifications" type="xs:string"/>
```

element **ScopeOfService/contractorResponsability**

diagram 

type **xs:string**

properties
isRef 0
content simple

source
```
<xs:element name="contractorResponsability" type="xs:string"/>
```

element **ScopeOfService/reports**

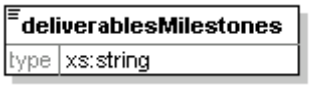
diagram 

type **xs:string**

properties
isRef 0
content simple

source
```
<xs:element name="reports" type="xs:string"/>
```

element **ScopeOfService/deliverablesMilestones**

diagram 

type **xs:string**

properties
isRef 0
content simple

source
```
<xs:element name="deliverablesMilestones" type="xs:string"/>
```

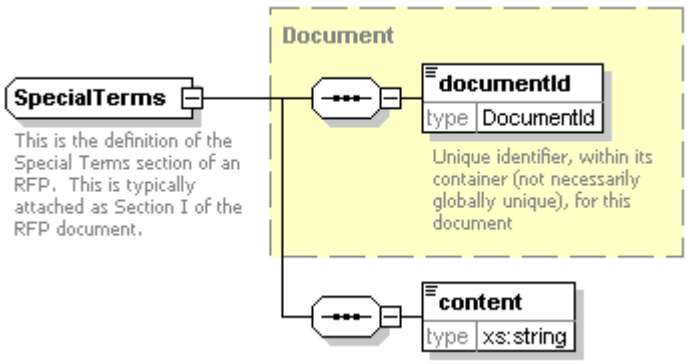
F.21. Types/RFPDocuments/SpecialTerms.xsd

schema location: **types\RFPDocuments\SpecialTerms.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
SpecialTerms

complexType **SpecialTerms**

diagram



type extension of **Document**

properties
base Document

children **documentId** **content**

annotation
documentation This is the definition of the Special Terms section of an RFP. This is typically attached as Section I of the RFP document.

source

```
<xs:complexType name="SpecialTerms">
 <xs:annotation>
  <xs:documentation>This is the definition of the Special Terms section of an RFP.  This is typically attached as Section I of the RFP document.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="content" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **SpecialTerms/content**

diagram

type **xs:string**

properties
isRef 0
content simple

source

```
<xs:element name="content" type="xs:string"/>
```

F.22. Types/RFPDocuments/Submissions.xsd

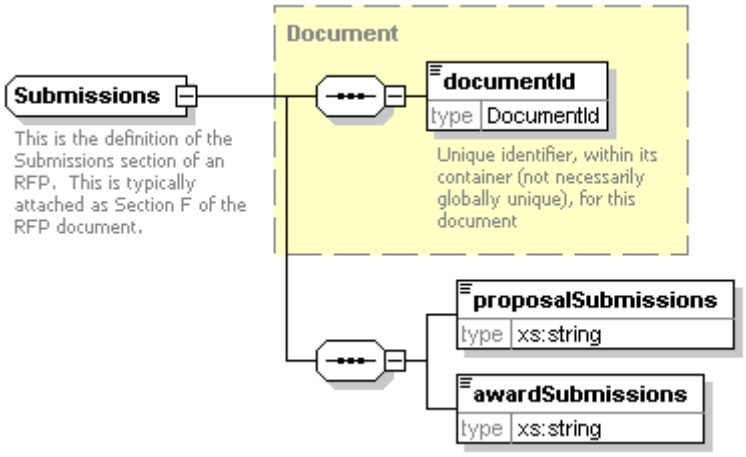
schema location: types\RFPDocuments\Submissions.xsd
attribute form default: **unqualified**
element form default: **qualified**

Complex types

Submissions

complexType **Submissions**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **proposalSubmissions** **awardSubmissions**

annotation
- documentation This is the definition of the Submissions section of an RFP. This is typically attached as Section F of the RFP document.

source

```
<xs:complexType name="Submissions">
 <xs:annotation>
  <xs:documentation>This is the definition of the Submissions section of an RFP.  This is typically attached as Section F of the RFP document.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="proposalSubmissions" type="xs:string"/>
    <xs:element name="awardSubmissions" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **Submissions/proposalSubmissions**

diagram

type **xs:string**

properties
- isRef 0
- content simple

source

```
<xs:element name="proposalSubmissions" type="xs:string"/>
```

element **Submissions/awardSubmissions**

diagram

type **xs:string**

properties isRef 0
content simple

source <xs:element name="awardSubmissions" type="xs:string"/>

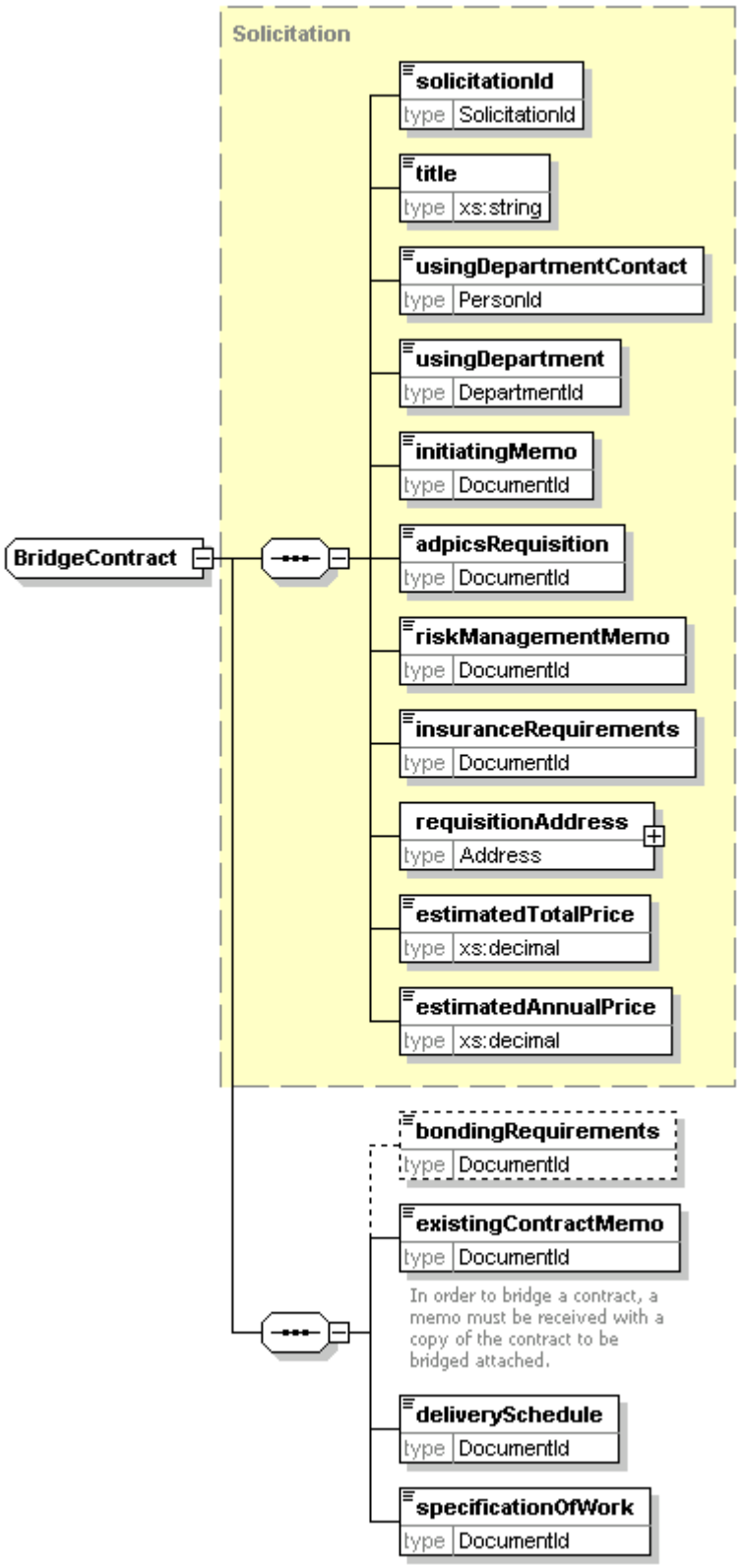
F.23. Types/Solicitation/BridgeContract.xsd

schema location: **types\solicitation\BridgeContract.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
BridgeContract

complexType **BridgeContract**

diagram



type extension of **Solicitation**

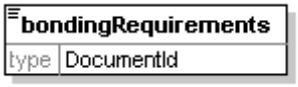
properties base Solicitation

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice** **bondingRequirements** **existingContractMemo** **deliverySchedule** **specificationOfWork**

source
```
<xs:complexType name="BridgeContract">
 <xs:complexContent>
  <xs:extension base="Solicitation">
   <xs:sequence>
    <xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
    <xs:element name="existingContractMemo" type="DocumentId">
     <xs:annotation>
      <xs:documentation>In order to bridge a contract, a memo must be received with a copy of the contract to be bridged attached.</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="deliverySchedule" type="DocumentId"/>
    <xs:element name="specificationOfWork" type="DocumentId"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **BridgeContract/bondingRequirements**

diagram



type **DocumentId**

properties isRef 0
content complex

source
```
<xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
```

element **BridgeContract/existingContractMemo**

diagram

type **DocumentId**

properties isRef 0
content complex

annotation documentation In order to bridge a contract, a memo must be received with a copy of the contract to be bridged attached.

source
```
<xs:element name="existingContractMemo" type="DocumentId">
 <xs:annotation>
  <xs:documentation>In order to bridge a contract, a memo must be received with a copy of the contract to be bridged attached.</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **BridgeContract/deliverySchedule**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="deliverySchedule" type="DocumentId"/>
```

element **BridgeContract/specificationOfWork**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="specificationOfWork" type="DocumentId"/>
```

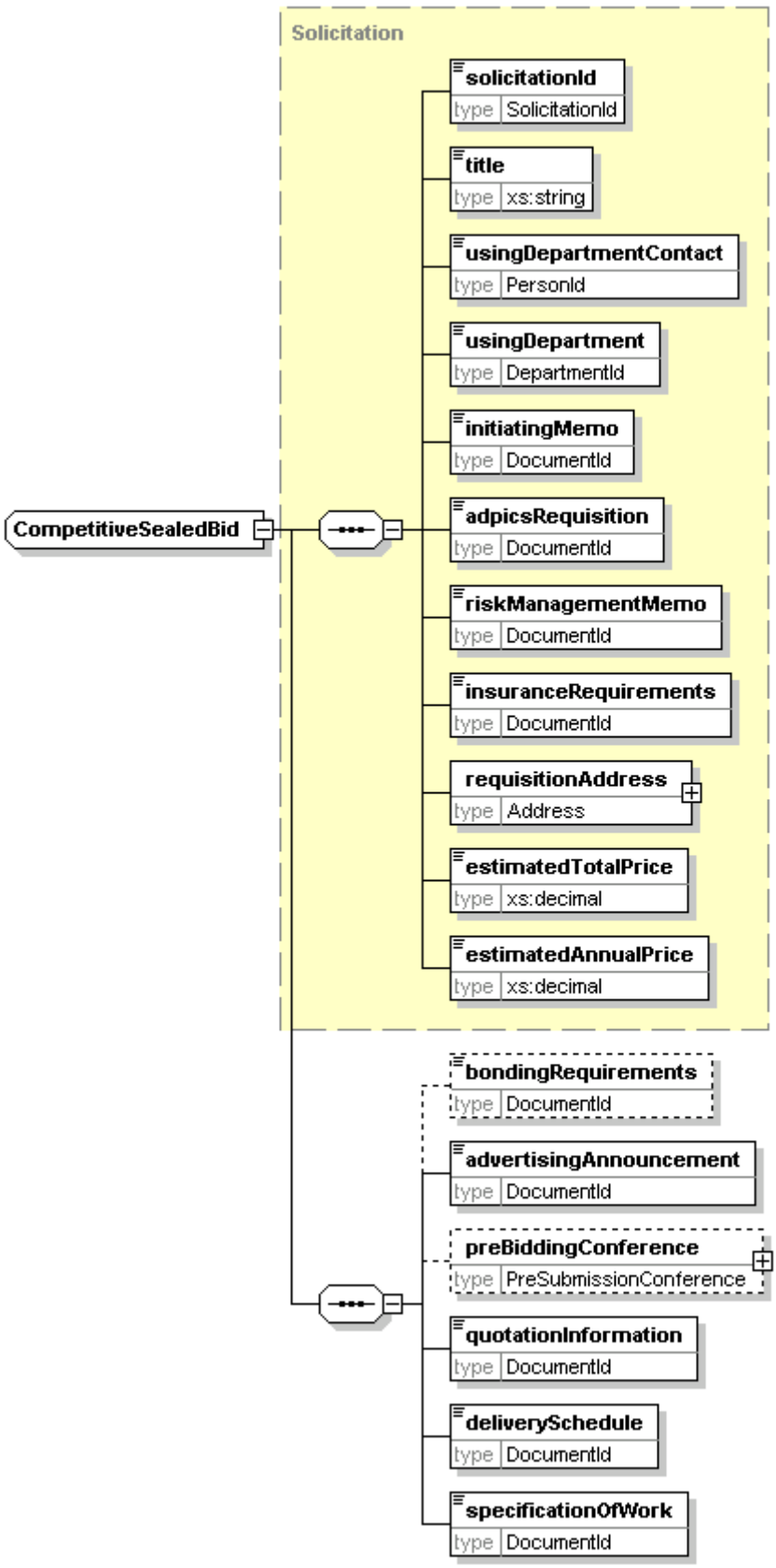
F.24. Types/Solicitation/CompetitiveSealedBid.xsd

schema location: **types\solicitation\CompetitiveSealedBid.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
CompetitiveSealedBid

complexType **CompetitiveSealedBid**

diagram


Solicitation
solicitationId
type SolicitationId
title
type xs:string
usingDepartmentContact
type PersonId
usingDepartment
type DepartmentId
initiatingMemo
type DocumentId
adpicsRequisition
type DocumentId
riskManagementMemo
type DocumentId
insuranceRequirements
type DocumentId
requisitionAddress
type Address
estimatedTotalPrice
type xs:decimal
estimatedAnnualPrice
type xs:decimal
CompetitiveSealedBid
bondingRequirements
type DocumentId
advertisingAnnouncement
type DocumentId
preBiddingConference
type PreSubmissionConference
quotationInformation
type DocumentId
deliverySchedule
type DocumentId
specificationOfWork
type DocumentId

type extension of **Solicitation**

properties base Solicitation

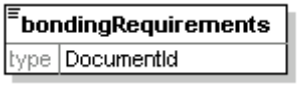
children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice** **bondingRequirements** **advertisingAnnouncement** **preBiddingConference** **quotationInformation** **deliverySchedule** **specificationOfWork**

source

```
<xs:complexType name="CompetitiveSealedBid">
 <xs:complexContent>
  <xs:extension base="Solicitation">
   <xs:sequence>
    <xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
    <xs:element name="advertisingAnnouncement" type="DocumentId"/>
    <xs:element name="preBiddingConference" type="PreSubmissionConference" minOccurs="0"/>
    <xs:element name="quotationInformation" type="DocumentId"/>
    <xs:element name="deliverySchedule" type="DocumentId"/>
    <xs:element name="specificationOfWork" type="DocumentId"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **CompetitiveSealedBid/bondingRequirements**

diagram



type **DocumentId**

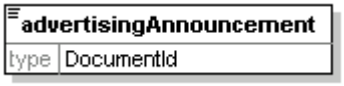
properties isRef 0
content complex

source

```
<xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
```

element **CompetitiveSealedBid/advertisingAnnouncement**

diagram



type **DocumentId**

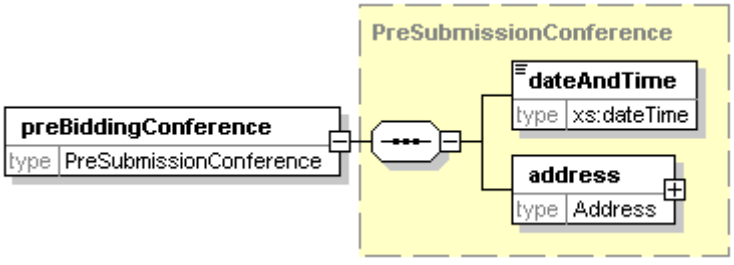
properties isRef 0
content complex

source

```
<xs:element name="advertisingAnnouncement" type="DocumentId"/>
```

element **CompetitiveSealedBid/preBiddingConference**

diagram



type **PreSubmissionConference**

properties isRef 0
content complex

children **dateAndTime** **address**

source <xs:element name="preBiddingConference" type="PreSubmissionConference" minOccurs="0"/>

element **CompetitiveSealedBid/quotationInformation**

diagram

type **DocumentId**

properties isRef 0
content complex

source <xs:element name="quotationInformation" type="DocumentId"/>

element **CompetitiveSealedBid/deliverySchedule**

diagram

type **DocumentId**

properties isRef 0
content complex

source <xs:element name="deliverySchedule" type="DocumentId"/>

element **CompetitiveSealedBid/specificationOfWork**

diagram

type **DocumentId**

properties isRef 0
content complex

source <xs:element name="specificationOfWork" type="DocumentId"/>

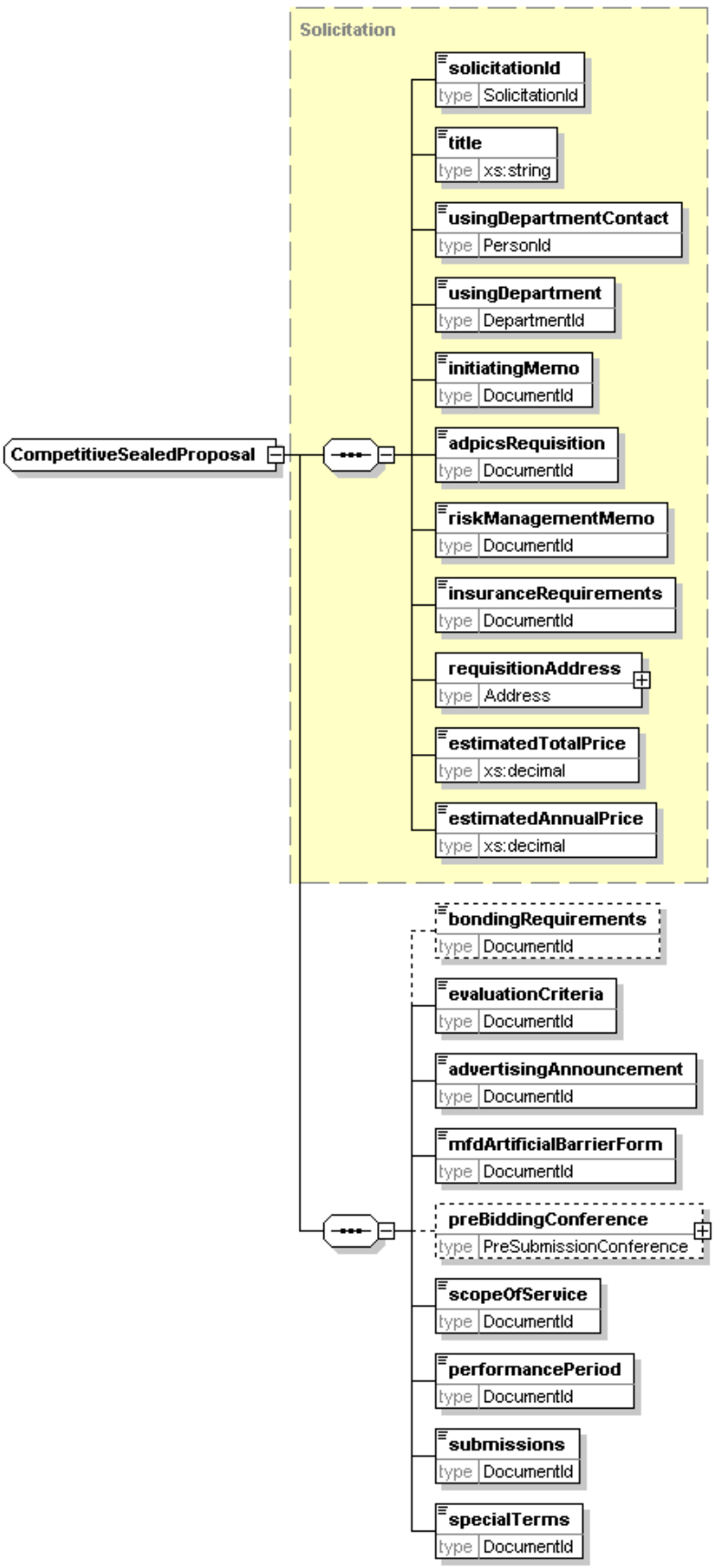
F.25. Types/Solicitation/CompetitiveSealedProposal.xsd

schema location: **types\solicitation\CompetitiveSealedProposal.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
CompetitiveSealedProposal

complexType **CompetitiveSealedProposal**

diagram


Solicitation
solicitationId
type SolicitationId
title
type xs:string
usingDepartmentContact
type PersonId
usingDepartment
type DepartmentId
initiatingMemo
type DocumentId
CompetitiveSealedProposal
adpicsRequisition
type DocumentId
riskManagementMemo
type DocumentId
insuranceRequirements
type DocumentId
requisitionAddress
type Address
estimatedTotalPrice
type xs:decimal
estimatedAnnualPrice
type xs:decimal
bondingRequirements
type DocumentId
evaluationCriteria
type DocumentId
advertisingAnnouncement
type DocumentId
mfdArtificialBarrierForm
type DocumentId
preBiddingConference
type PreSubmissionConference
scopeOfService
type DocumentId
performancePeriod
type DocumentId
submissions
type DocumentId
specialTerms
type DocumentId

type extension of **Solicitation**

properties
base Solicitation

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice** **bondingRequirements** **evaluationCriteria** **advertisingAnnouncement** **mfdArtificialBarrierForm** **preBiddingConference** **scopeOfService** **performancePeriod** **submissions** **specialTerms**

source

```
<xs:complexType name="CompetitiveSealedProposal">
 <xs:complexContent>
  <xs:extension base="Solicitation">
   <xs:sequence>
    <xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
    <xs:element name="evaluationCriteria" type="DocumentId"/>
    <xs:element name="advertisingAnnouncement" type="DocumentId"/>
    <xs:element name="mfdArtificialBarrierForm" type="DocumentId"/>
    <xs:element name="preBiddingConference" type="PreSubmissionConference" minOccurs="0"/>
    <xs:element name="scopeOfService" type="DocumentId"/>
    <xs:element name="performancePeriod" type="DocumentId"/>
    <xs:element name="submissions" type="DocumentId"/>
    <xs:element name="specialTerms" type="DocumentId"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **CompetitiveSealedProposal/bondingRequirements**

diagram

type **DocumentId**

properties
isRef 0
content complex

source

```
<xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
```

element **CompetitiveSealedProposal/evaluationCriteria**

diagram

type **DocumentId**

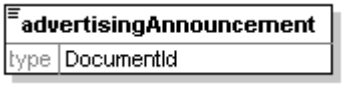
properties
isRef 0
content complex

source

```
<xs:element name="evaluationCriteria" type="DocumentId"/>
```

element **CompetitiveSealedProposal/advertisingAnnouncement**

diagram



type **DocumentId**

properties
isRef 0
content complex

source

```
<xs:element name="advertisingAnnouncement" type="DocumentId"/>
```

element **CompetitiveSealedProposal/mfdArtificialBarrierForm**

diagram

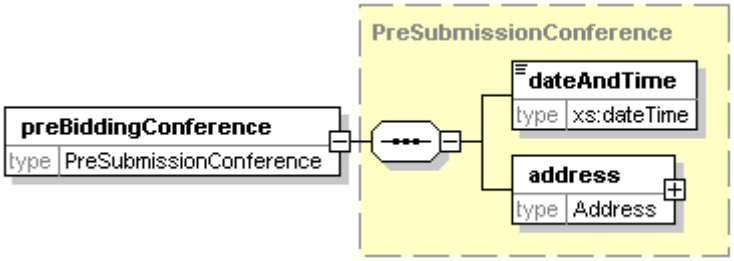
type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="mfdArtificialBarrierForm" type="DocumentId"/>
```

element **CompetitiveSealedProposal/preBiddingConference**

diagram



type **PreSubmissionConference**

properties
isRef 0
content complex

children **dateAndTime** **address**

source
```
<xs:element name="preBiddingConference" type="PreSubmissionConference" minOccurs="0"/>
```

element **CompetitiveSealedProposal/scopeOfService**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="scopeOfService" type="DocumentId"/>
```

element **CompetitiveSealedProposal/performancePeriod**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="performancePeriod" type="DocumentId"/>
```

element **CompetitiveSealedProposal/submissions**

diagram 

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="submissions" type="DocumentId"/>
```

element **CompetitiveSealedProposal/specialTerms**

diagram 

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="specialTerms" type="DocumentId"/>
```

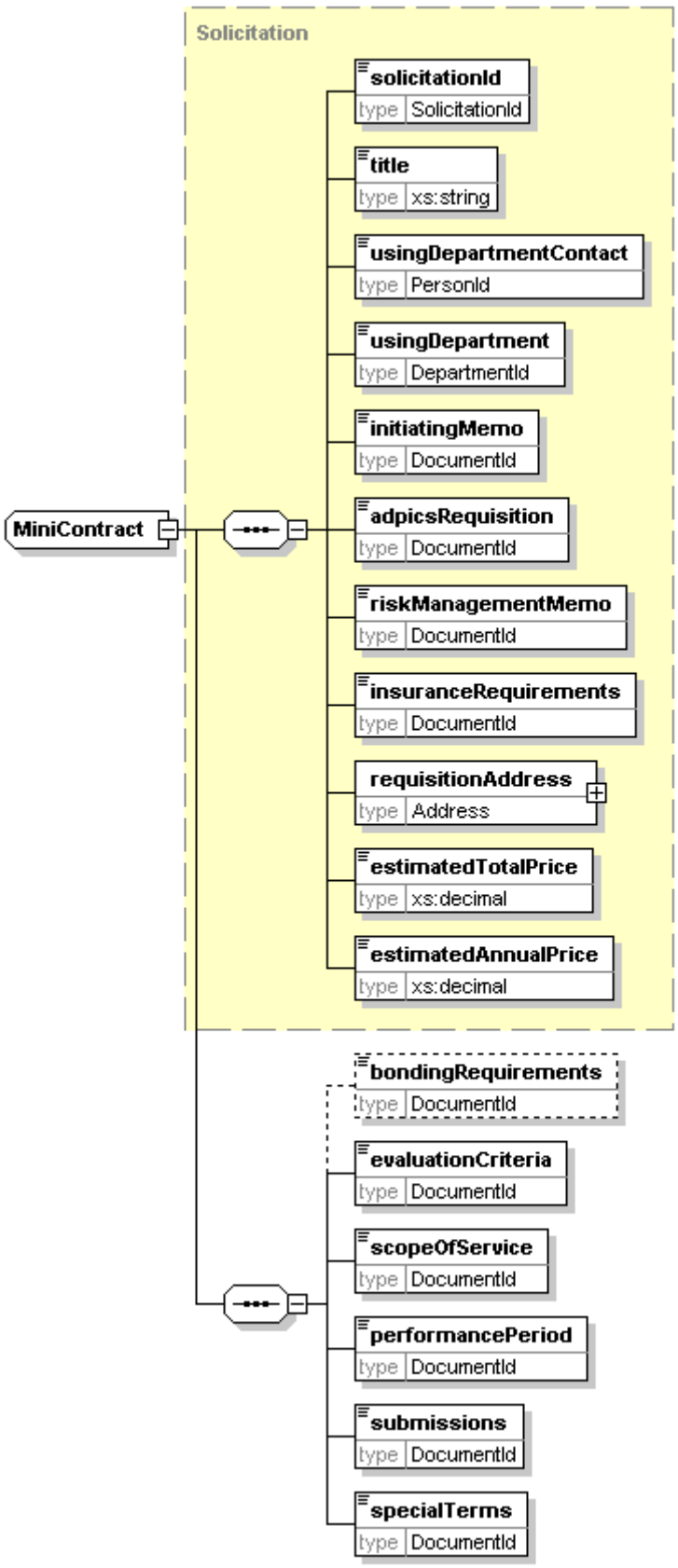
F.26. Types/Solicitation/MiniContract.xsd

schema location: **types\solicitation\MiniContract.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
MiniContract

complexType **MiniContract**

diagram


Solicitation
solicitationId
type SolicitationId
title
type xs:string
usingDepartmentContact
type PersonId
usingDepartment
type DepartmentId
initiatingMemo
type DocumentId
MiniContract
adpicsRequisition
type DocumentId
riskManagementMemo
type DocumentId
insuranceRequirements
type DocumentId
requisitionAddress
type Address
estimatedTotalPrice
type xs:decimal
estimatedAnnualPrice
type xs:decimal
bondingRequirements
type DocumentId
evaluationCriteria
type DocumentId
scopeOfService
type DocumentId
performancePeriod
type DocumentId
submissions
type DocumentId
specialTerms
type DocumentId

type extension of **Solicitation**

properties base Solicitation

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice** **bondingRequirements** **evaluationCriteria** **scopeOfService** **performancePeriod** **submissions** **specialTerms**

source

```
<xs:complexType name="MiniContract">
 <xs:complexContent>
  <xs:extension base="Solicitation">
   <xs:sequence>
    <xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
    <xs:element name="evaluationCriteria" type="DocumentId"/>
    <xs:element name="scopeOfService" type="DocumentId"/>
    <xs:element name="performancePeriod" type="DocumentId"/>
    <xs:element name="submissions" type="DocumentId"/>
    <xs:element name="specialTerms" type="DocumentId"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **MiniContract/bondingRequirements**

diagram

type **DocumentId**

properties isRef 0
content complex

source `<xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>`

element **MiniContract/evaluationCriteria**

diagram

type **DocumentId**

properties isRef 0
content complex

source `<xs:element name="evaluationCriteria" type="DocumentId"/>`

element **MiniContract/scopeOfService**

diagram

type **DocumentId**

properties isRef 0
content complex

source `<xs:element name="scopeOfService" type="DocumentId"/>`

element **MiniContract/performancePeriod**

diagram 

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="performancePeriod" type="DocumentId"/>
```

element **MiniContract/submissions**

diagram 

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="submissions" type="DocumentId"/>
```

element **MiniContract/specialTerms**

diagram 

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="specialTerms" type="DocumentId"/>
```

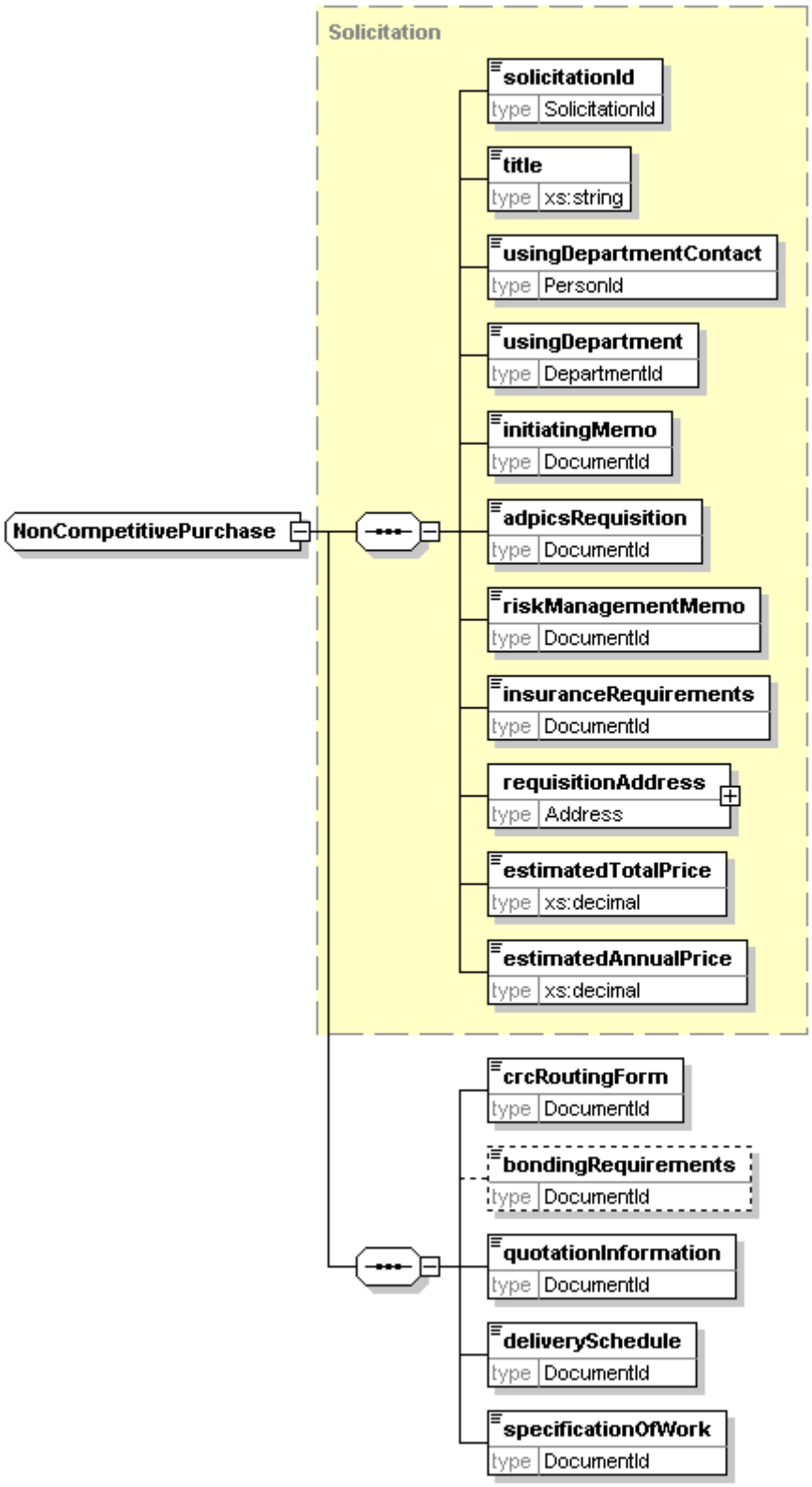
F.27. Types/Solicitation/NonCompetitivePurchase.xsd

schema location: **types\solicitation\NonCompetitivePurchase.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
NonCompetitivePurchase

complexType **NonCompetitivePurchase**

diagram



type extension of **Solicitation**

properties base Solicitation

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice** **crcRoutingForm** **bondingRequirements** **quotationInformation** **deliverySchedule** **specificationOfWork**

source

```
<xs:complexType name="NonCompetitivePurchase">
 <xs:complexContent>
  <xs:extension base="Solicitation">
   <xs:sequence>
    <xs:element name="crcRoutingForm" type="DocumentId"/>
    <xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
    <xs:element name="quotationInformation" type="DocumentId"/>
    <xs:element name="deliverySchedule" type="DocumentId"/>
    <xs:element name="specificationOfWork" type="DocumentId"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **NonCompetitivePurchase/crcRoutingForm**

diagram

type **DocumentId**

properties isRef 0
content complex

source

```
<xs:element name="crcRoutingForm" type="DocumentId"/>
```

element **NonCompetitivePurchase/bondingRequirements**

diagram

type **DocumentId**

properties isRef 0
content complex

source

```
<xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
```

element **NonCompetitivePurchase/quotationInformation**

diagram

type **DocumentId**

properties isRef 0
content complex

source

```
<xs:element name="quotationInformation" type="DocumentId"/>
```

element **NonCompetitivePurchase/deliverySchedule**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="deliverySchedule" type="DocumentId"/>
```

element **NonCompetitivePurchase/specificationOfWork**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="specificationOfWork" type="DocumentId"/>
```

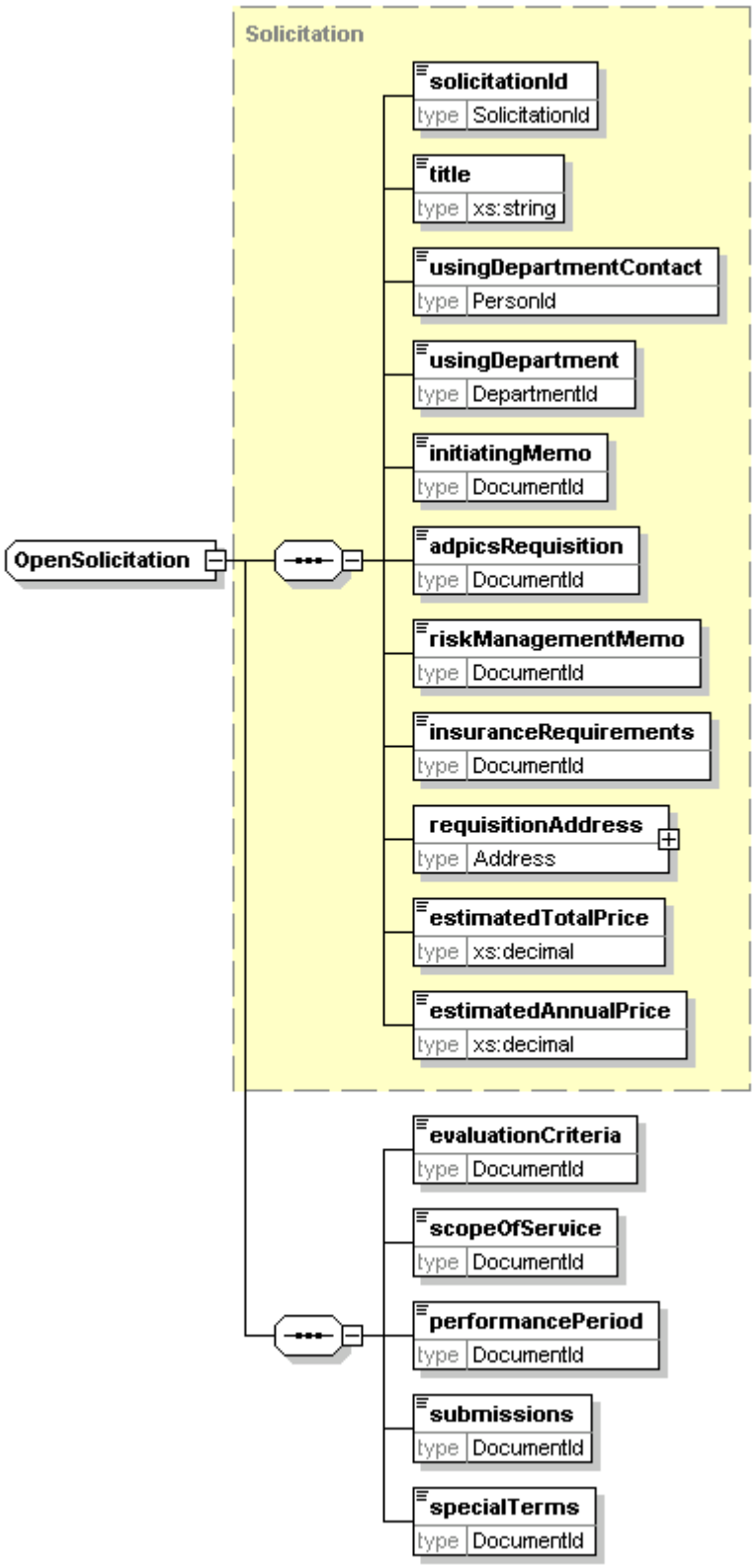
F.28. Types/Solicitation/OpenSolicitation.xsd

schema location: **types\solicitation\OpenSolicitation.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
OpenSolicitation

complexType **OpenSolicitation**

diagram



type extension of **Solicitation**

properties base Solicitation

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice** **evaluationCriteria** **scopeOfService** **performancePeriod** **submissions** **specialTerms**

source
```
<xs:complexType name="OpenSolicitation">
 <xs:complexContent>
  <xs:extension base="Solicitation">
   <xs:sequence>
    <xs:element name="evaluationCriteria" type="DocumentId"/>
    <xs:element name="scopeOfService" type="DocumentId"/>
    <xs:element name="performancePeriod" type="DocumentId"/>
    <xs:element name="submissions" type="DocumentId"/>
    <xs:element name="specialTerms" type="DocumentId"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **OpenSolicitation/evaluationCriteria**

diagram

type **DocumentId**

properties isRef 0
content complex

source
```
<xs:element name="evaluationCriteria" type="DocumentId"/>
```

element **OpenSolicitation/scopeOfService**

diagram

type **DocumentId**

properties isRef 0
content complex

source
```
<xs:element name="scopeOfService" type="DocumentId"/>
```

element **OpenSolicitation/performancePeriod**

diagram

type **DocumentId**

properties isRef 0
content complex

source
```
<xs:element name="performancePeriod" type="DocumentId"/>
```

element **OpenSolicitation/submissions**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="submissions" type="DocumentId"/>
```

element **OpenSolicitation/specialTerms**

diagram

type **DocumentId**

properties
isRef 0
content complex

source
```
<xs:element name="specialTerms" type="DocumentId"/>
```

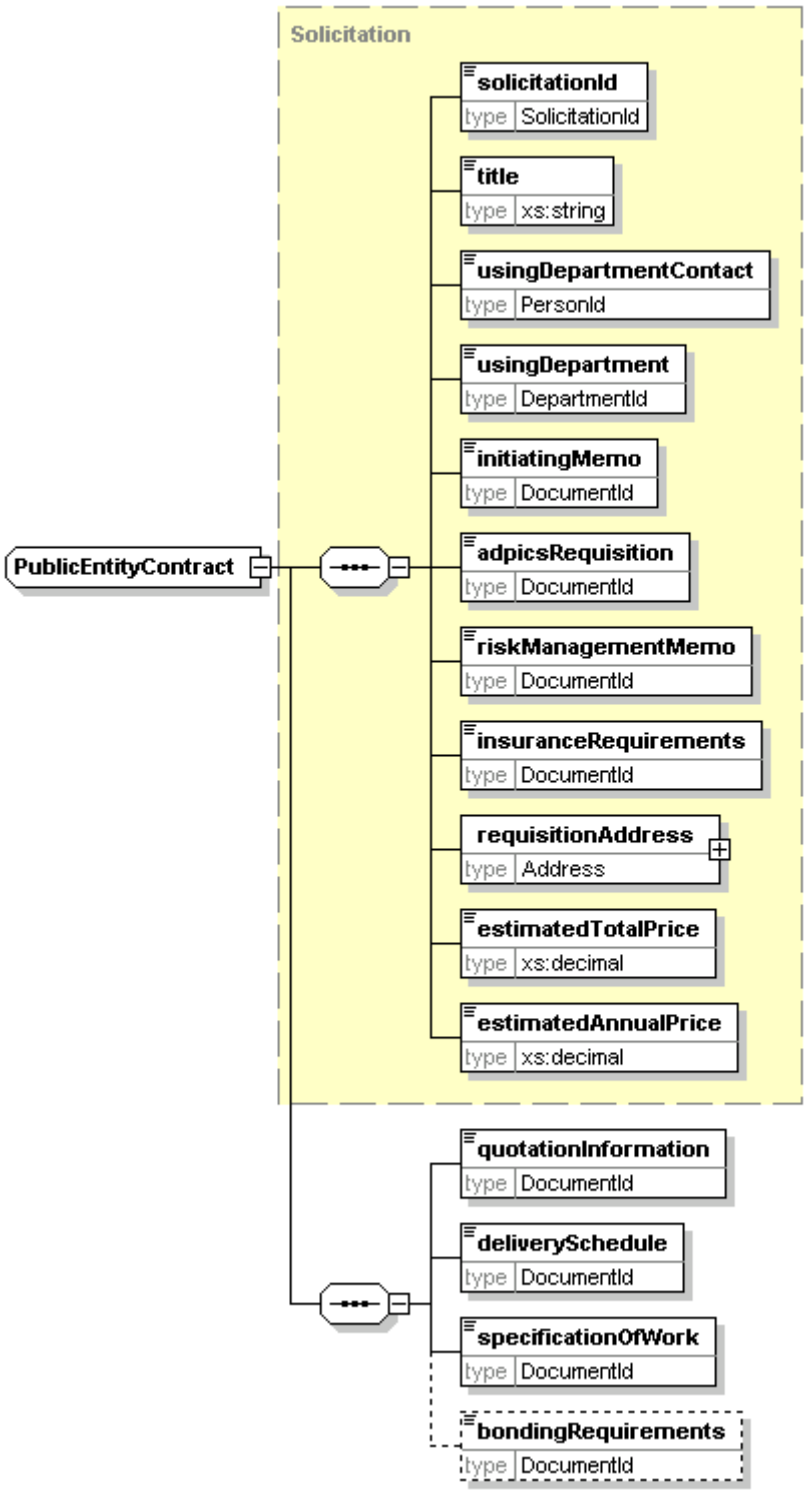
F.29. Types/Solicitation/PublicEntityContract.xsd

schema location: **types\solicitation\PublicEntityContract.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
PublicEntityContract

complexType **PublicEntityContract**

diagram



type extension of **Solicitation**

properties base Solicitation

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice**

quotationInformation deliverySchedule specificationOfWork bondingRequirements

source
```
<xs:complexType name="PublicEntityContract">
 <xs:complexContent>
  <xs:extension base="Solicitation">
   <xs:sequence>
    <xs:element name="quotationInformation" type="DocumentId"/>
    <xs:element name="deliverySchedule" type="DocumentId"/>
    <xs:element name="specificationOfWork" type="DocumentId"/>
    <xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **PublicEntityContract/quotationInformation**

diagram

type **DocumentId**

properties
- isRef 0
- content complex

source
```
<xs:element name="quotationInformation" type="DocumentId"/>
```

element **PublicEntityContract/deliverySchedule**

diagram

type **DocumentId**

properties
- isRef 0
- content complex

source
```
<xs:element name="deliverySchedule" type="DocumentId"/>
```

element **PublicEntityContract/specificationOfWork**

diagram

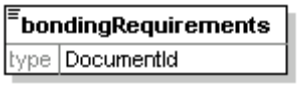
type **DocumentId**

properties
- isRef 0
- content complex

source
```
<xs:element name="specificationOfWork" type="DocumentId"/>
```

element **PublicEntityContract/bondingRequirements**

diagram



type **DocumentId**

properties
- isRef 0
- content complex

source <xs:element name="bondingRequirements" type="DocumentId" minOccurs="0"/>

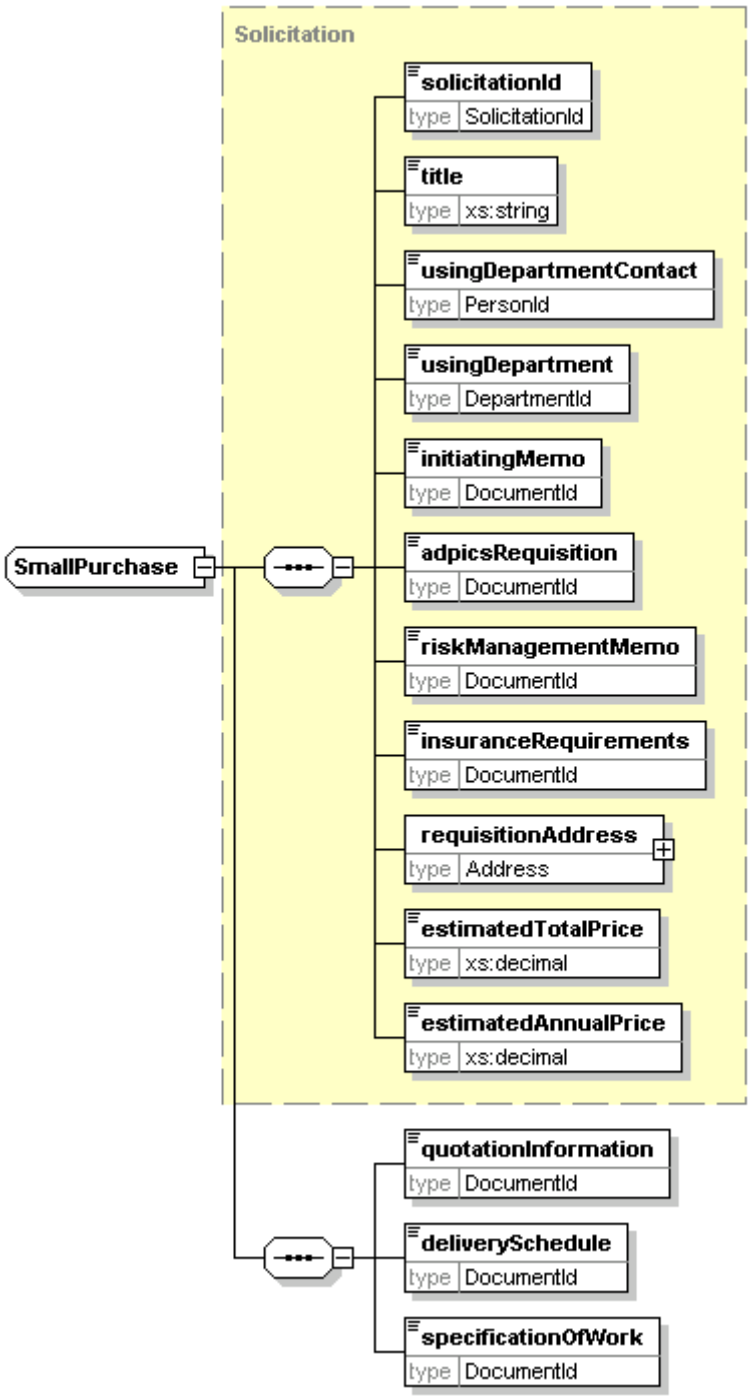
F.30. Types/Solicitation/SmallPurchase.xsd

schema location: **types\solicitation\SmallPurchase.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
SmallPurchase

complexType **SmallPurchase**

diagram



type extension of **Solicitation**

properties base Solicitation

children **solicitationId** **title** **usingDepartmentContact** **usingDepartment** **initiatingMemo** **adpicsRequisition** **riskManagementMemo** **insuranceRequirements** **requisitionAddress** **estimatedTotalPrice** **estimatedAnnualPrice** **quotationInformation** **deliverySchedule** **specificationOfWork**

source

```
<xs:complexType name="SmallPurchase">
  <xs:complexContent>
    <xs:extension base="Solicitation">
```

```
      <xs:sequence>
        <xs:element name="quotationInformation" type="DocumentId"/>
        <xs:element name="deliverySchedule" type="DocumentId"/>
        <xs:element name="specificationOfWork" type="DocumentId"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

element **SmallPurchase/quotationInformation**

diagram

type **DocumentId**

properties
- isRef 0
- content complex

source
```
<xs:element name="quotationInformation" type="DocumentId"/>
```

element **SmallPurchase/deliverySchedule**

diagram

type **DocumentId**

properties
- isRef 0
- content complex

source
```
<xs:element name="deliverySchedule" type="DocumentId"/>
```

element **SmallPurchase/specificationOfWork**

diagram

type **DocumentId**

properties
- isRef 0
- content complex

source
```
<xs:element name="specificationOfWork" type="DocumentId"/>
```

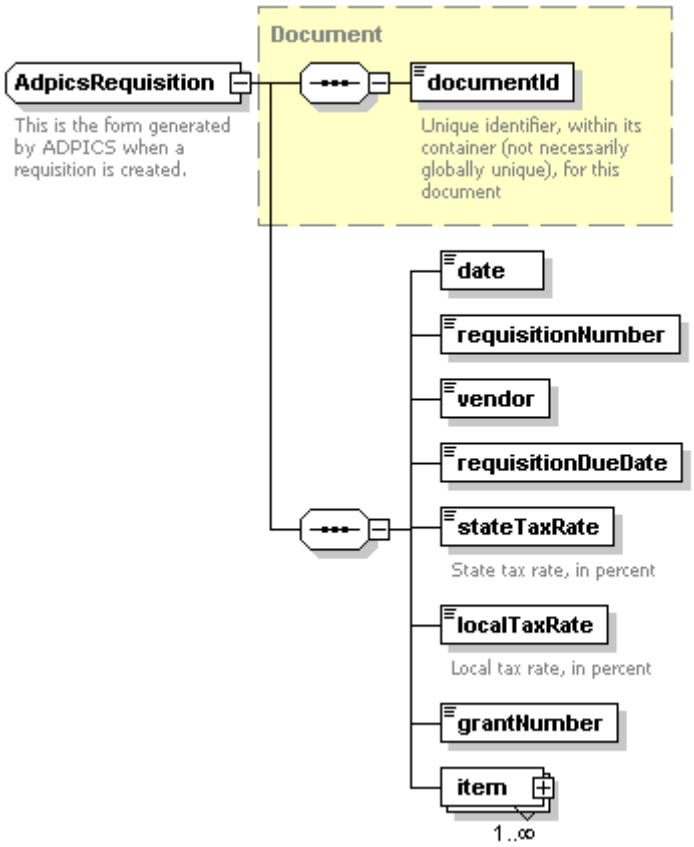
F.31. Types/Solicitation Documents/AdpicsRequisition.xsd

schema location: **types\SolicitationDocuments\AdpicsRequisition.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
AdpicsRequisition
GoodOrService

complexType **AdpicsRequisition**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **date** **requisitionNumber** **vendor** **requisitionDueDate** **stateTaxRate** **localTaxRate** **grantNumber** **item**

annotation
- documentation This is the form generated by ADPICS when a requisition is created.

source

```
<xs:complexType name="AdpicsRequisition">
 <xs:annotation>
  <xs:documentation>This is the form generated by ADPICS when a requisition is created.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="date" type="xs:date"/>
    <xs:element name="requisitionNumber" type="SolicitationId"/>
    <xs:element name="vendor" type="VendorId"/>
    <xs:element name="requisitionDueDate" type="xs:date"/>
    <xs:element name="stateTaxRate" type="xs:decimal">
     <xs:annotation>
      <xs:documentation>State tax rate, in percent</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="localTaxRate" type="xs:decimal">
     <xs:annotation>
      <xs:documentation>Local tax rate, in percent</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="grantNumber" type="xs:string"/>
    <xs:element name="item" type="GoodOrService" maxOccurs="unbounded"/>
   </xs:sequence>
  </xs:extension>
```

```
    </xs:complexContent>
  </xs:complexType>
```

element **AdpicsRequisition/date**

diagram 

type **xs:date**

properties
- isRef 0
- content simple

source
```
<xs:element name="date" type="xs:date"/>
```

element **AdpicsRequisition/requisitionNumber**

diagram 

type **SolicitationId**

properties
- isRef 0
- content complex

source
```
<xs:element name="requisitionNumber" type="SolicitationId"/>
```

element **AdpicsRequisition/vendor**

diagram 

type **VendorId**

properties
- isRef 0
- content complex

source
```
<xs:element name="vendor" type="VendorId"/>
```

element **AdpicsRequisition/requisitionDueDate**

diagram 

type **xs:date**

properties
- isRef 0
- content simple

source
```
<xs:element name="requisitionDueDate" type="xs:date"/>
```

element **AdpicsRequisition/stateTaxRate**

diagram 

type **xs:decimal**

properties
- isRef 0
- content simple

annotation
- documentation State tax rate, in percent

source
```
<xs:element name="stateTaxRate" type="xs:decimal">
```

```
 <xs:annotation>
  <xs:documentation>State tax rate, in percent</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **AdpicsRequisition/localTaxRate**

diagram

type **xs:decimal**

properties
- isRef 0
- content simple

annotation
- documentation Local tax rate, in percent

source

```
<xs:element name="localTaxRate" type="xs:decimal">
 <xs:annotation>
  <xs:documentation>Local tax rate, in percent</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **AdpicsRequisition/grantNumber**

diagram

type **xs:string**

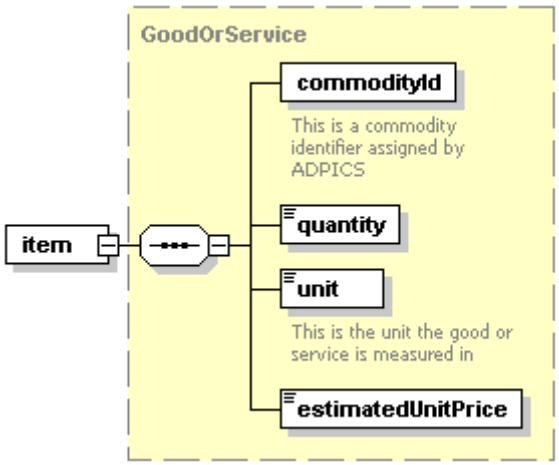
properties
- isRef 0
- content simple

source

```
<xs:element name="grantNumber" type="xs:string"/>
```

element **AdpicsRequisition/item**

diagram



type **GoodOrService**

properties
- isRef 0
- content complex

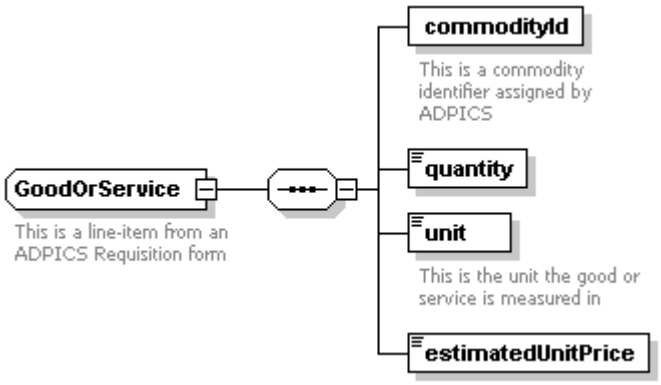
children **commodityId** **quantity** **unit** **estimatedUnitPrice**

source

```
<xs:element name="item" type="GoodOrService" maxOccurs="unbounded"/>
```

complexType **GoodOrService**

diagram



children **commodityId** **quantity** **unit** **estimatedUnitPrice**

used by
element **AdpicsRequisition/item**

annotation
documentation This is a line-item from an ADPICS Requisition form

source

```
<xs:complexType name="GoodOrService">
 <xs:annotation>
  <xs:documentation>This is a line-item from an ADPICS Requisition form</xs:documentation>
 </xs:annotation>
 <xs:sequence>
  <xs:element name="commodityId">
   <xs:annotation>
    <xs:documentation>This is a commodity identifier assigned by ADPICS</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="quantity" type="xs:int"/>
  <xs:element name="unit" type="xs:string">
   <xs:annotation>
    <xs:documentation>This is the unit the good or service is measured in</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="estimatedUnitPrice" type="xs:decimal"/>
 </xs:sequence>
</xs:complexType>
```

element **GoodOrService/commodityId**

diagram

properties
isRef 0

annotation
documentation This is a commodity identifier assigned by ADPICS

source

```
<xs:element name="commodityId">
 <xs:annotation>
  <xs:documentation>This is a commodity identifier assigned by ADPICS</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **GoodOrService/quantity**

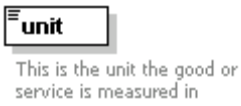
diagram 

type **xs:int**

properties
isRef 0
content simple

source
```
<xs:element name="quantity" type="xs:int"/>
```

element **GoodOrService/unit**

diagram 

type **xs:string**

properties
isRef 0
content simple

annotation
documentation This is the unit the good or service is measured in

source
```
<xs:element name="unit" type="xs:string">
  <xs:annotation>
    <xs:documentation>This is the unit the good or service is measured in</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **GoodOrService/estimatedUnitPrice**

diagram 

type **xs:decimal**

properties
isRef 0
content simple

source
```
<xs:element name="estimatedUnitPrice" type="xs:decimal"/>
```

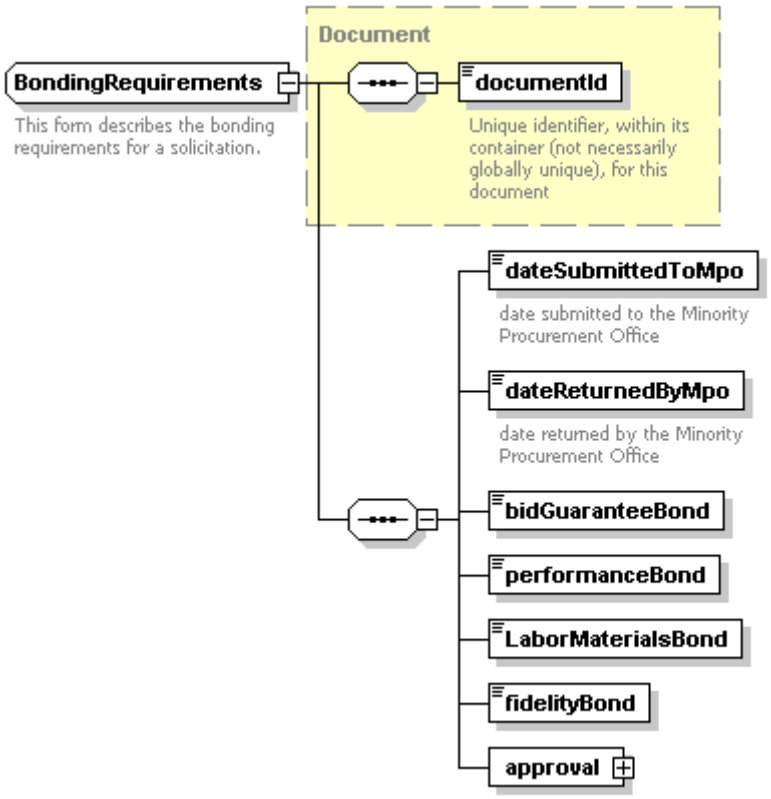
F.32. Types/Solicitation Documents/BondingRequirements.xsd

schema location: **types\SolicitationDocuments\BondingRequirements.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
BondingRequirements

complexType **BondingRequirements**

diagram



type extension of **Document**

properties base Document

children **documentId** **dateSubmittedToMpo** **dateReturnedByMpo** **bidGuaranteeBond** **performanceBond** **LaborMaterialsBond** **fidelityBond** **approval**

annotation documentation This form describes the bonding requirements for a solicitation.

source

```
<xs:complexType name="BondingRequirements">
 <xs:annotation>
  <xs:documentation>This form describes the bonding requirements for a solicitation.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="dateSubmittedToMpo" type="xs:date">
     <xs:annotation>
      <xs:documentation>date submitted to the Minority Procurement Office</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="dateReturnedByMpo" type="xs:date">
     <xs:annotation>
      <xs:documentation>date returned by the Minority Procurement Office</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="bidGuaranteeBond" type="xs:decimal"/>
    <xs:element name="performanceBond" type="xs:decimal"/>
    <xs:element name="LaborMaterialsBond" type="xs:decimal"/>
    <xs:element name="fidelityBond" type="xs:decimal"/>
    <xs:element name="approval" type="Approval"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **BondingRequirements/dateSubmittedToMpo**

diagram

type **xs:date**

properties
- isRef 0
- content simple

annotation
- documentation date submitted to the Minority Procurement Office

source

```
<xs:element name="dateSubmittedToMpo" type="xs:date">
 <xs:annotation>
  <xs:documentation>date submitted to the Minority Procurement Office</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **BondingRequirements/dateReturnedByMpo**

diagram

type **xs:date**

properties
- isRef 0
- content simple

annotation
- documentation date returned by the Minority Procurement Office

source

```
<xs:element name="dateReturnedByMpo" type="xs:date">
 <xs:annotation>
  <xs:documentation>date returned by the Minority Procurement Office</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **BondingRequirements/bidGuaranteeBond**

diagram

type **xs:decimal**

properties
- isRef 0
- content simple

source

```
<xs:element name="bidGuaranteeBond" type="xs:decimal"/>
```

element **BondingRequirements/performanceBond**

diagram

type **xs:decimal**

properties
- isRef 0
- content simple

source

```
<xs:element name="performanceBond" type="xs:decimal"/>
```

element **BondingRequirements/LaborMaterialsBond**

diagram

type **xs:decimal**

properties
isRef 0
content simple

source
```
<xs:element name="LaborMaterialsBond" type="xs:decimal"/>
```

element **BondingRequirements/fidelityBond**

diagram

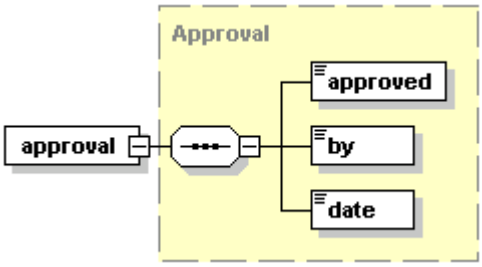
type **xs:decimal**

properties
isRef 0
content simple

source
```
<xs:element name="fidelityBond" type="xs:decimal"/>
```

element **BondingRequirements/approval**

diagram



type **Approval**

properties
isRef 0
content complex

children **approved by date**

source
```
<xs:element name="approval" type="Approval"/>
```

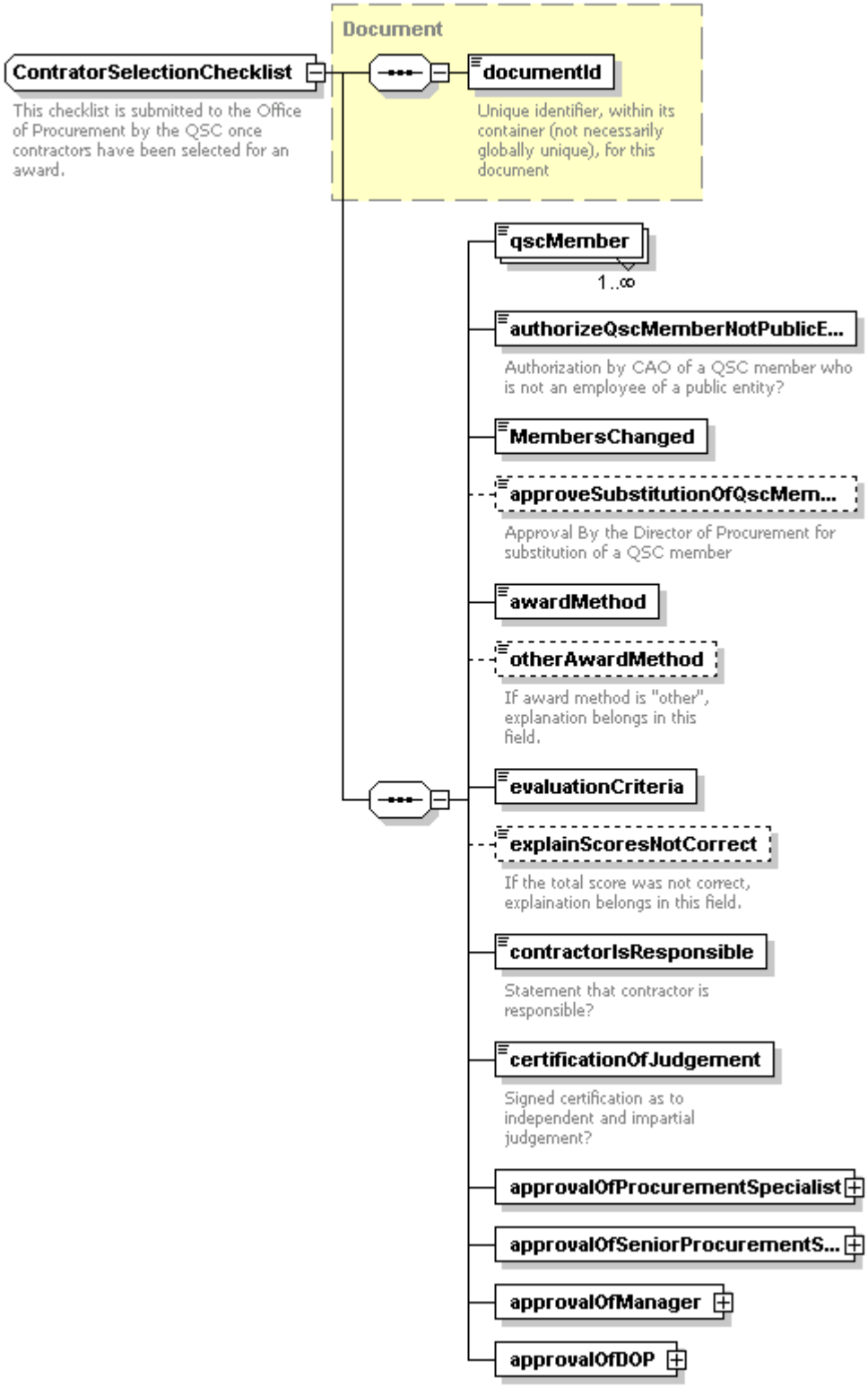
F.33. Types/Solicitation Documents/ContractorSelectionChecklist.xsd

schema location: **types\SolicitationDocuments\ContractorSelectionChecklist.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
ContratorSelectionChecklist

complexType **ContratorSelectionChecklist**

diagram



type extension of **Document**

properties base Document

children **documentId** **qscMember** **authorizeQscMemberNotPublicEmployee** **MembersChanged** **approveSubstitutionOfQscMember** **awardMethod** **otherAwardMethod** **evaluationCriteria** **explainScoresNotCorrect** **contractorIsResponsible** **certificationOfJudgement** **approvalOfProcurementSpecialist** **approvalOfSeniorProcurementSpecialist** **approvalOfManager** **approvalOfDOP**

annotation
documentation This checklist is submitted to the Office of Procurement by the QSC once contractors have been selected for an award.

source

```
<xs:complexType name="ContratorSelectionChecklist">
 <xs:annotation>
  <xs:documentation>This checklist is submitted to the Office of Procurement by the QSC once contractors have been selected for an award.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="qscMember" type="PersonId" maxOccurs="unbounded"/>
    <xs:element name="authorizeQscMemberNotPublicEmployee" type="xs:boolean">
     <xs:annotation>
      <xs:documentation>Authorization by CAO of a QSC member who is not an employee of a public entity?</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="MembersChanged" type="xs:boolean"/>
    <xs:element name="approveSubstitutionOfQscMember" type="xs:boolean" minOccurs="0">
     <xs:annotation>
      <xs:documentation>Approval By the Director of Procurement for substitution of a QSC member</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="awardMethod">
     <xs:simpleType>
      <xs:restriction base="xs:string">
       <xs:enumeration value="other"/>
       <xs:enumeration value="ProposalInterview"/>
       <xs:enumeration value="ProposalOnly"/>
      </xs:restriction>
     </xs:simpleType>
    </xs:element>
    <xs:element name="otherAwardMethod" type="xs:string" minOccurs="0">
     <xs:annotation>
      <xs:documentation>If award method is "other", explanation belongs in this field.</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="evaluationCriteria">
     <xs:simpleType>
      <xs:restriction base="xs:string">
       <xs:enumeration value="totalScoresNotCorrect"/>
       <xs:enumeration value="totalScoresByCategoryCorrect"/>
       <xs:enumeration value="interviewsOrDemonstrationsRatedCorrectly"/>
       <xs:enumeration value="writtenProposalsRatedCorrectly"/>
      </xs:restriction>
     </xs:simpleType>
    </xs:element>
    <xs:element name="explainScoresNotCorrect" type="xs:string" minOccurs="0">
     <xs:annotation>
      <xs:documentation>If the total score was not correct, explaination belongs in this field.</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="contractorIsResponsible" type="xs:boolean">
     <xs:annotation>
      <xs:documentation>Statement that contractor is responsible?</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="certificationOfJudgement" type="xs:boolean">
     <xs:annotation>
      <xs:documentation>Signed certification as to independent and impartial judgement?</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="approvalOfProcurementSpecialist" type="Approval"/>
    <xs:element name="approvalOfSeniorProcurementSpecialist" type="Approval"/>
    <xs:element name="approvalOfManager" type="Approval"/>
```

```
      <xs:element name="approvalOfDOP" type="Approval"/>
    </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **ContratorSelectionChecklist/qscMember**

diagram

type **PersonId**

properties
- isRef 0
- content complex

source
```
<xs:element name="qscMember" type="PersonId" maxOccurs="unbounded"/>
```

element **ContratorSelectionChecklist/authorizeQscMemberNotPublicEmployee**

diagram

type **xs:boolean**

properties
- isRef 0
- content simple

annotation
- documentation Authorization by CAO of a QSC member who is not an employee of a public entity?

source
```
<xs:element name="authorizeQscMemberNotPublicEmployee" type="xs:boolean">
 <xs:annotation>
  <xs:documentation>Authorization by CAO of a QSC member who is not an employee of a public
entity?</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **ContratorSelectionChecklist/MembersChanged**

diagram

type **xs:boolean**

properties
- isRef 0
- content simple

source
```
<xs:element name="MembersChanged" type="xs:boolean"/>
```

element **ContratorSelectionChecklist/approveSubstitutionOfQscMember**

diagram

type **xs:boolean**

properties
- isRef 0
- content simple

annotation
- documentation Approval By the Director of Procurement for substitution of a QSC member

source
```
<xs:element name="approveSubstitutionOfQscMember" type="xs:boolean" minOccurs="0">
 <xs:annotation>
```

```
    <xs:documentation>Approval By the Director of Procurement for substitution of a QSC member</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **ContratorSelectionChecklist/awardMethod**

diagram

type restriction of **xs:string**

properties
- isRef 0
- content simple

facets
- enumeration other
- enumeration ProposalInterview
- enumeration ProposalOnly

source

```
<xs:element name="awardMethod">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="other"/>
      <xs:enumeration value="ProposalInterview"/>
      <xs:enumeration value="ProposalOnly"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```

element **ContratorSelectionChecklist/otherAwardMethod**

diagram

type **xs:string**

properties
- isRef 0
- content simple

annotation
- documentation If award method is "other", explanation belongs in this field.

source

```
<xs:element name="otherAwardMethod" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>If award method is "other", explanation belongs in this field.</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **ContratorSelectionChecklist/evaluationCriteria**

diagram

type restriction of **xs:string**

properties
- isRef 0
- content simple

facets
- enumeration totalScoresNotCorrect
- enumeration totalScoresByCategoryCorrect
- enumeration interviewsOrDemonstrationsRatedCorrectly
- enumeration writtenProposalsRatedCorrectly

source

```
<xs:element name="evaluationCriteria">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="totalScoresNotCorrect"/>
      <xs:enumeration value="totalScoresByCategoryCorrect"/>
```

```
      <xs:enumeration value="interviewsOrDemonstrationsRatedCorrectly"/>
      <xs:enumeration value="writtenProposalsRatedCorrectly"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```

element **ContratorSelectionChecklist/explainScoresNotCorrect**

diagram

type **xs:string**

properties
- isRef 0
- content simple

annotation
- documentation If the total score was not correct, explaination belongs in this field.

source

```
<xs:element name="explainScoresNotCorrect" type="xs:string" minOccurs="0">
  <xs:annotation>
    <xs:documentation>If the total score was not correct, explaination belongs in this field.</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **ContratorSelectionChecklist/contractorIsResponsible**

diagram

type **xs:boolean**

properties
- isRef 0
- content simple

annotation
- documentation Statement that contractor is responsible?

source

```
<xs:element name="contractorIsResponsible" type="xs:boolean">
  <xs:annotation>
    <xs:documentation>Statement that contractor is responsible?</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **ContratorSelectionChecklist/certificationOfJudgement**

diagram

type **xs:boolean**

properties
- isRef 0
- content simple

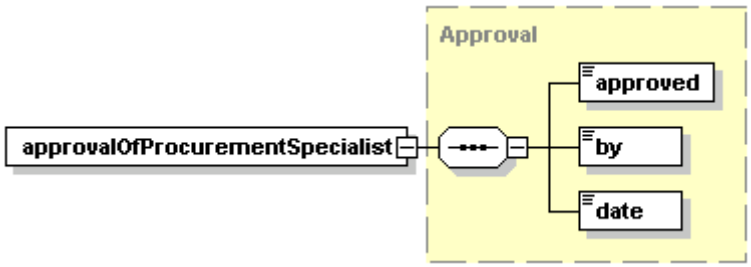
annotation
- documentation Signed certification as to independent and impartial judgement?

source

```
<xs:element name="certificationOfJudgement" type="xs:boolean">
  <xs:annotation>
    <xs:documentation>Signed certification as to independent and impartial judgement?</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **ContratorSelectionChecklist/approvalOfProcurementSpecialist**

diagram



type **Approval**

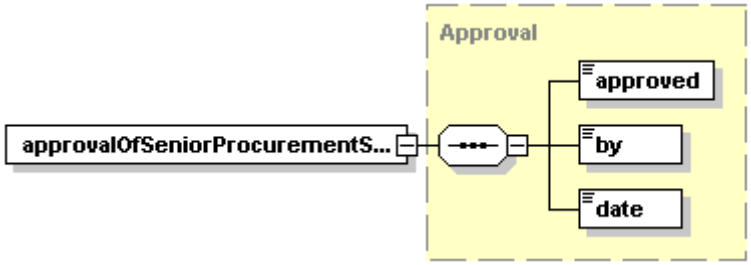
properties
isRef 0
content complex

children **approved** **by** **date**

source <xs:element name="approvalOfProcurementSpecialist" type="Approval"/>

element **ContratorSelectionChecklist/approvalOfSeniorProcurementSpecialist**

diagram



type **Approval**

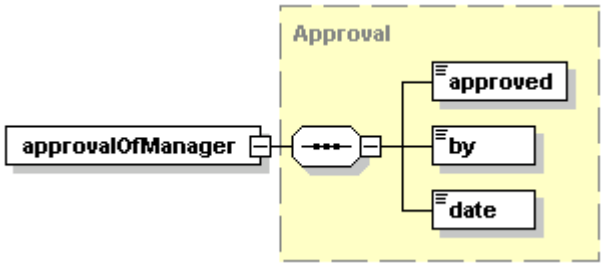
properties
isRef 0
content complex

children **approved** **by** **date**

source <xs:element name="approvalOfSeniorProcurementSpecialist" type="Approval"/>

element **ContratorSelectionChecklist/approvalOfManager**

diagram



type **Approval**

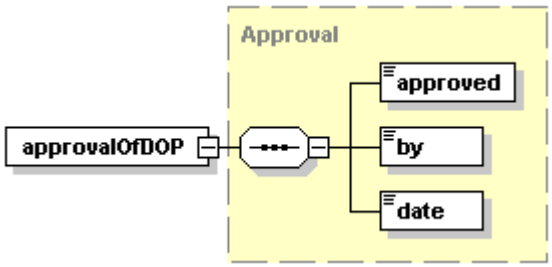
properties
isRef 0
content complex

children **approved** **by** **date**

source <xs:element name="approvalOfManager" type="Approval"/>

element **ContratorSelectionChecklist/approvalOfDOP**

diagram



type	**Approval**
properties	isRef 0 content complex
children	**approved** **by** **date**
source	<xs:element name="approvalOfDOP" type="Approval"/>

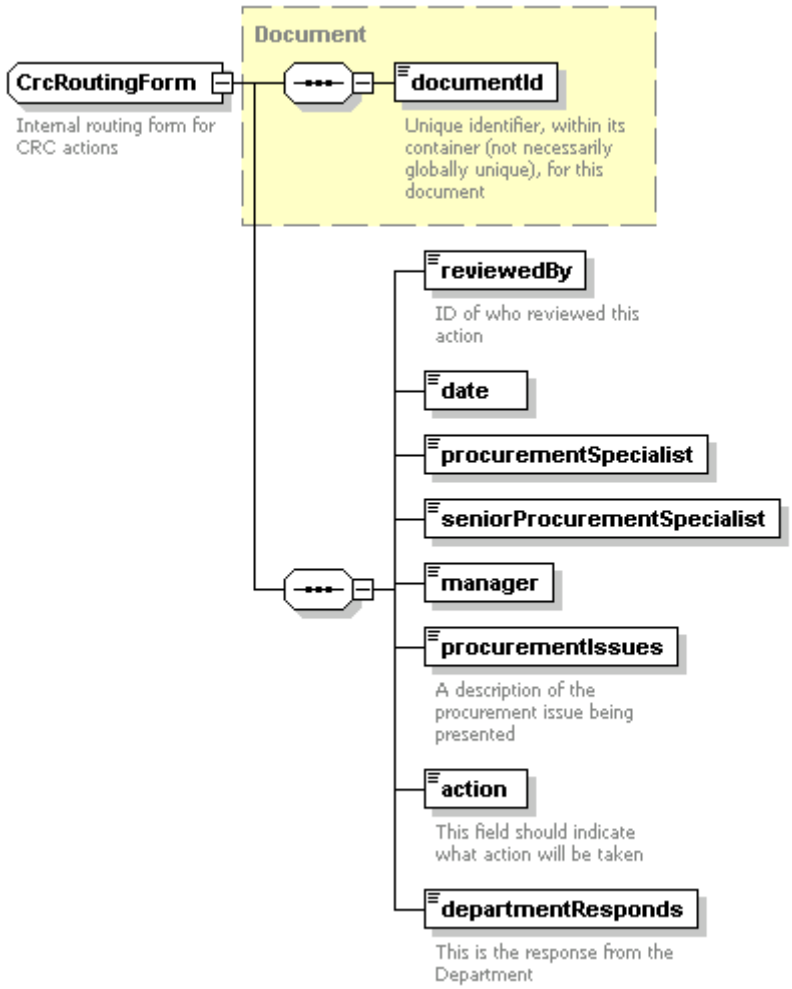
F.34. Types/Solicitation Documents/CrcRoutingForm.xsd

schema location: **types\SolicitationDocuments\CrcRoutingForm.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
CrcRoutingForm

complexType **CrcRoutingForm**

diagram



type extension of **Document**

properties base Document

children **documentId** **reviewedBy** **date** **procurementSpecialist** **seniorProcurementSpecialist** **manager** **procurementIssues** **action** **departmentResponds**

annotation documentation Internal routing form for CRC actions

source

```
<xs:complexType name="CrcRoutingForm">
 <xs:annotation>
  <xs:documentation>Internal routing form for CRC actions</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="reviewedBy" type="PersonId">
     <xs:annotation>
      <xs:documentation>ID of who reviewed this action</xs:documentation>
     </xs:annotation>
    </xs:element>
    <xs:element name="date" type="xs:date"/>
    <xs:element name="procurementSpecialist" type="PersonId"/>
    <xs:element name="seniorProcurementSpecialist" type="PersonId"/>
    <xs:element name="manager" type="PersonId"/>
    <xs:element name="procurementIssues" type="xs:string">
     <xs:annotation>
      <xs:documentation>A description of the procurement issue being presented</xs:documentation>
```

```
      </xs:annotation>
    </xs:element>
    <xs:element name="action">
      <xs:annotation>
        <xs:documentation>This field should indicate what action will be taken</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="notifyDepartmentOfIssues"/>
          <xs:enumeration value="submitForCrcAgenda"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="departmentResponds">
      <xs:annotation>
        <xs:documentation>This is the response from the Department</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="willDeferAndResubmit"/>
          <xs:enumeration value="willDiscussIssues"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
  </xs:sequence>
 </xs:extension>
</xs:complexContent>
</xs:complexType>
```

element **CrcRoutingForm/reviewedBy**

diagram

type **PersonId**

properties
- isRef 0
- content complex

annotation
- documentation ID of who reviewed this action

source

```
<xs:element name="reviewedBy" type="PersonId">
 <xs:annotation>
  <xs:documentation>ID of who reviewed this action</xs:documentation>
 </xs:annotation>
</xs:element>
```

element **CrcRoutingForm/date**

diagram

type **xs:date**

properties
- isRef 0
- content simple

source

```
<xs:element name="date" type="xs:date"/>
```

element **CrcRoutingForm/procurementSpecialist**

diagram

type **PersonId**

properties
isRef 0
content complex

source
```
<xs:element name="procurementSpecialist" type="PersonId"/>
```

element **CrcRoutingForm/seniorProcurementSpecialist**

diagram

type **PersonId**

properties
isRef 0
content complex

source
```
<xs:element name="seniorProcurementSpecialist" type="PersonId"/>
```

element **CrcRoutingForm/manager**

diagram

type **PersonId**

properties
isRef 0
content complex

source
```
<xs:element name="manager" type="PersonId"/>
```

element **CrcRoutingForm/procurementIssues**

diagram

type **xs:string**

properties
isRef 0
content simple

annotation
documentation A description of the procurement issue being presented

source
```
<xs:element name="procurementIssues" type="xs:string">
  <xs:annotation>
    <xs:documentation>A description of the procurement issue being presented</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **CrcRoutingForm/action**

diagram

type restriction of **xs:string**

properties
isRef 0
content simple

facets
enumeration notifyDepartmentOfIssues
enumeration submitForCrcAgenda

annotation
documentation This field should indicate what action will be taken

source

```
<xs:element name="action">
 <xs:annotation>
  <xs:documentation>This field should indicate what action will be taken</xs:documentation>
 </xs:annotation>
 <xs:simpleType>
  <xs:restriction base="xs:string">
   <xs:enumeration value="notifyDepartmentOfIssues"/>
   <xs:enumeration value="submitForCrcAgenda"/>
  </xs:restriction>
 </xs:simpleType>
</xs:element>
```

element **CrcRoutingForm/departmentResponds**

diagram

type restriction of **xs:string**

properties

isRef	0
content	simple

facets

enumeration	willDeferAndResubmit
enumeration	willDiscussIssues

annotation

documentation	This is the response from the Department

source

```
<xs:element name="departmentResponds">
 <xs:annotation>
  <xs:documentation>This is the response from the Department</xs:documentation>
 </xs:annotation>
 <xs:simpleType>
  <xs:restriction base="xs:string">
   <xs:enumeration value="willDeferAndResubmit"/>
   <xs:enumeration value="willDiscussIssues"/>
  </xs:restriction>
 </xs:simpleType>
</xs:element>
```

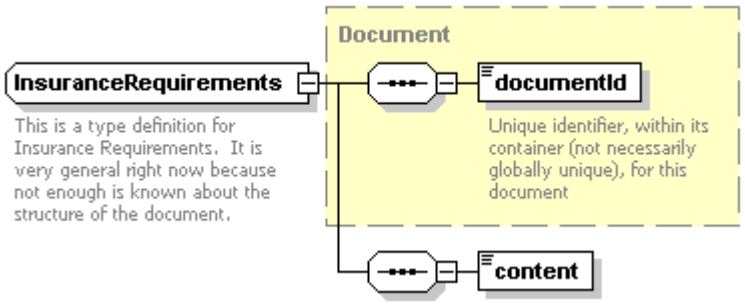
F.35. Types/Solicitation Documents/InsuranceRequirements.xsd

schema location: **types\SolicitationDocuments\InsuranceRequirements.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
InsuranceRequirements

complexType **InsuranceRequirements**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **content**

annotation
- documentation This is a type definition for Insurance Requirements. It is very general right now because not enough is known about the structure of the document.

source

```
<xs:complexType name="InsuranceRequirements">
 <xs:annotation>
  <xs:documentation>This is a type definition for Insurance Requirements.  It is very general right now because not enough is known about the structure of the document.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="content" type="xs:string"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **InsuranceRequirements/content**

diagram

type **xs:string**

properties
- isRef 0
- content simple

source

```
<xs:element name="content" type="xs:string"/>
```

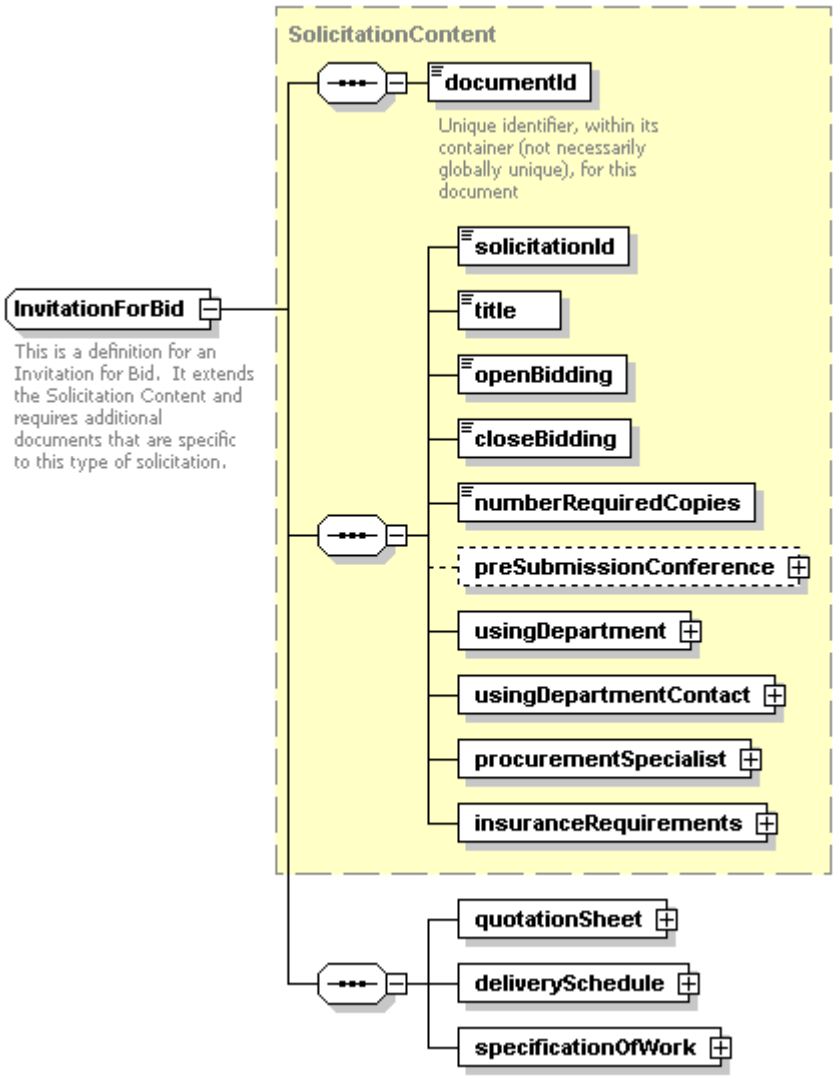
F.36. Types/Solicitation Documents/InvitationForBid.xsd

schema location: **types\SolicitationDocuments\InvitationForBid.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
InvitationForBid

complexType **InvitationForBid**

diagram



type extension of **SolicitationContent**

properties base SolicitationContent

children **documentId** **solicitationId** **title** **openBidding** **closeBidding** **numberRequiredCopies** **preSubmissionConference** **usingDepartment** **usingDepartmentContact** **procurementSpecialist** **insuranceRequirements** **quotationSheet** **deliverySchedule** **specificationOfWork**

annotation documentation This is a definition for an Invitation for Bid. It extends the Solicitation Content and requires additional documents that are specific to this type of solicitation.

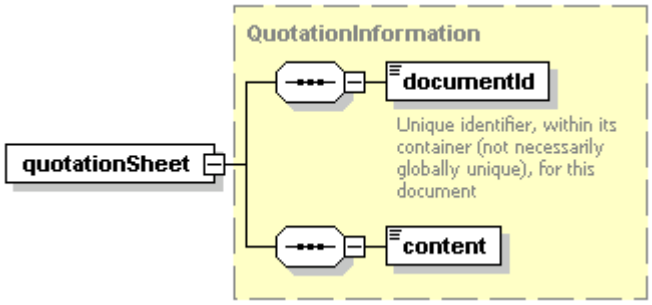
source

```
<xs:complexType name="InvitationForBid">
  <xs:annotation>
    <xs:documentation>This is a definition for an Invitation for Bid.  It extends the Solicitation Content and requires additional documents that are specific to this type of solicitation.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="SolicitationContent">
      <xs:sequence>
        <xs:element name="quotationSheet" type="QuotationInformation"/>
        <xs:element name="deliverySchedule" type="DeliverySchedule"/>
        <xs:element name="specificationOfWork" type="SpecificationOfWork"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
```

```
</xs:complexType>
```

element **InvitationForBid/quotationSheet**

diagram



type **QuotationInformation**

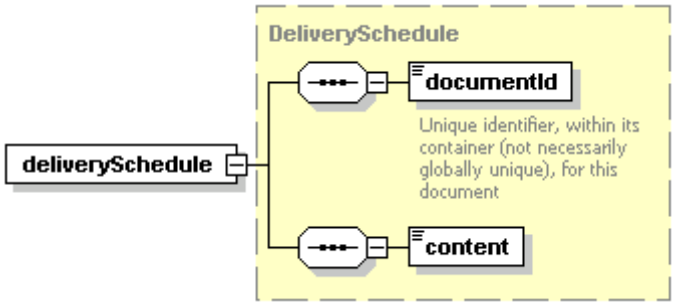
properties
- isRef 0
- content complex

children **documentId** **content**

source
```
<xs:element name="quotationSheet" type="QuotationInformation"/>
```

element **InvitationForBid/deliverySchedule**

diagram



type **DeliverySchedule**

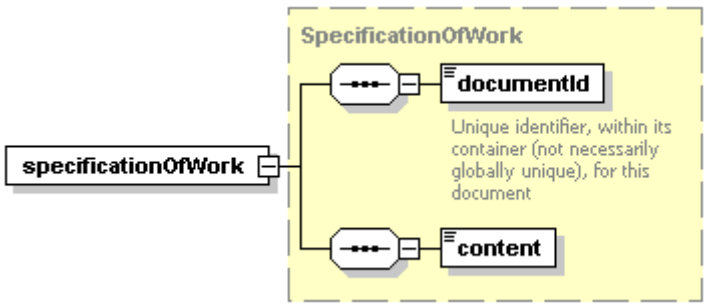
properties
- isRef 0
- content complex

children **documentId** **content**

source
```
<xs:element name="deliverySchedule" type="DeliverySchedule"/>
```

element **InvitationForBid/specificationOfWork**

diagram



type **SpecificationOfWork**

properties	isRef	0
	content	complex
children	**documentId** **content**	
source	<xs:element name="specificationOfWork" type="SpecificationOfWork"/>	

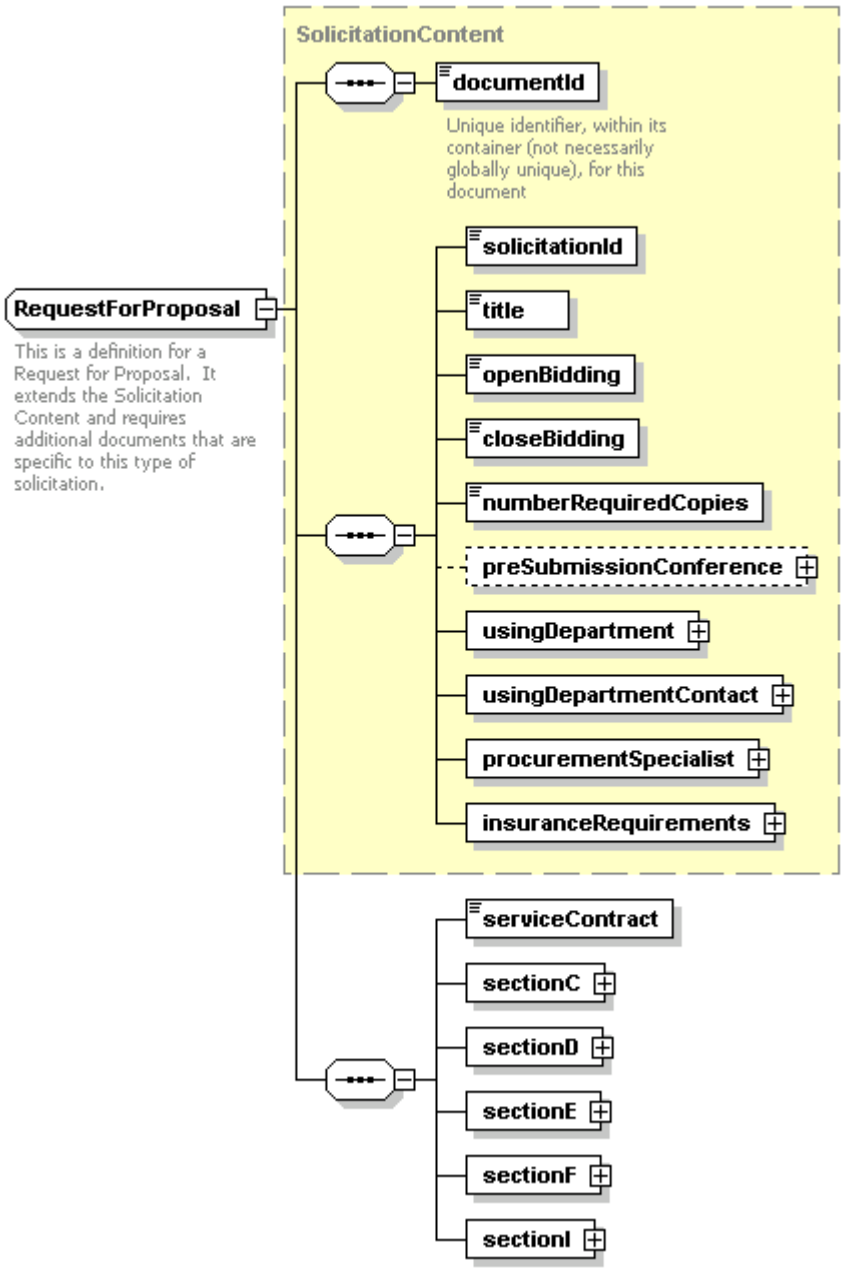
F.37. Types/Solicitation Documents/RequestForProposal.xsd

schema location: **types\SolicitationDocuments\RequestForProposal.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
RequestForProposal

complexType **RequestForProposal**

diagram



type extension of **SolicitationContent**

properties base SolicitationContent

children **documentId** **solicitationId** **title** **openBidding** **closeBidding** **numberRequiredCopies** **preSubmissionConference** **usingDepartment** **usingDepartmentContact** **procurementSpecialist** **insuranceRequirements** **serviceContract** **sectionC** **sectionD** **sectionE** **sectionF** **sectionI**

annotation documentation This is a definition for a Request for Proposal. It extends the Solicitation Content and requires additional documents that are specific to this type of solicitation.

source

```
<xs:complexType name="RequestForProposal">
 <xs:annotation>
  <xs:documentation>This is a definition for a Request for Proposal.  It extends the Solicitation Content and requires additional documents that are specific to this type of solicitation.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
```

```
    <xs:extension base="SolicitationContent">
      <xs:sequence>
        <xs:element name="serviceContract" type="xs:boolean"/>
        <xs:element name="sectionC" type="ScopeOfService"/>
        <xs:element name="sectionD" type="PerformancePeriod"/>
        <xs:element name="sectionE" type="EvaluationCriteria"/>
        <xs:element name="sectionF" type="Submissions"/>
        <xs:element name="sectionI" type="SpecialTerms"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

element **RequestForProposal/serviceContract**

diagram

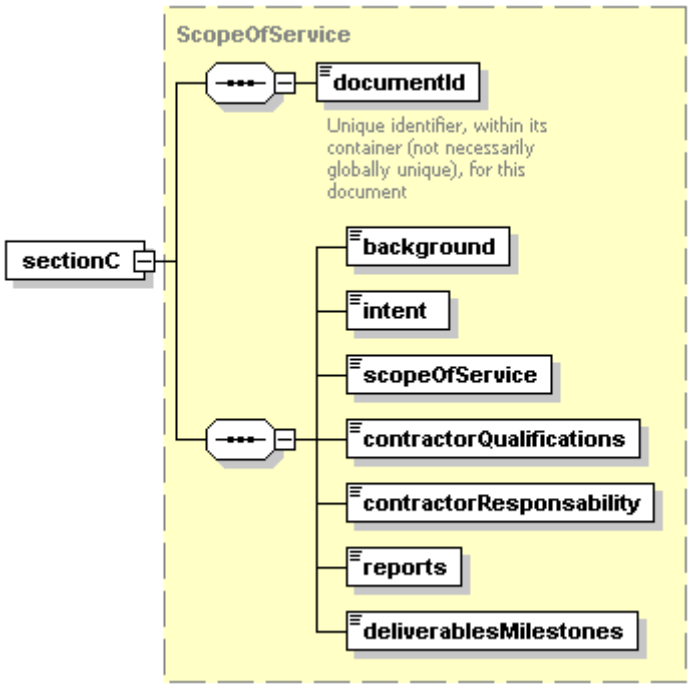
type **xs:boolean**

properties
- isRef 0
- content simple

source
```
<xs:element name="serviceContract" type="xs:boolean"/>
```

element **RequestForProposal/sectionC**

diagram



type **ScopeOfService**

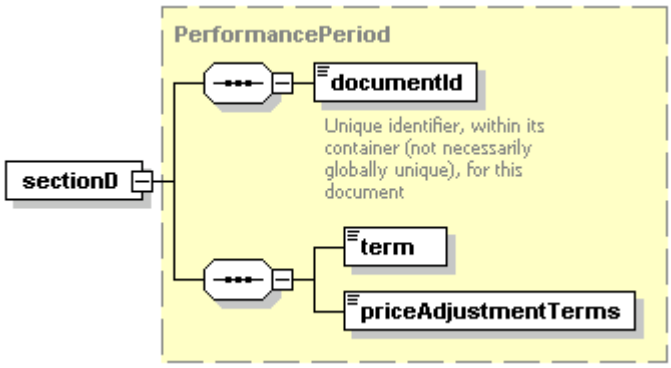
properties
- isRef 0
- content complex

children **documentId** **background** **intent** **scopeOfService** **contractorQualifications** **contractorResponsability** **reports** **deliverablesMilestones**

source
```
<xs:element name="sectionC" type="ScopeOfService"/>
```

element **RequestForProposal/sectionD**

diagram



type **PerformancePeriod**

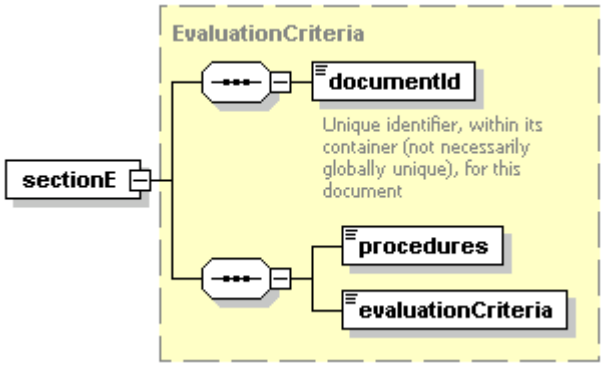
properties
isRef 0
content complex

children **documentId** **term** **priceAdjustmentTerms**

source
```
<xs:element name="sectionD" type="PerformancePeriod"/>
```

element **RequestForProposal/sectionE**

diagram



type **EvaluationCriteria**

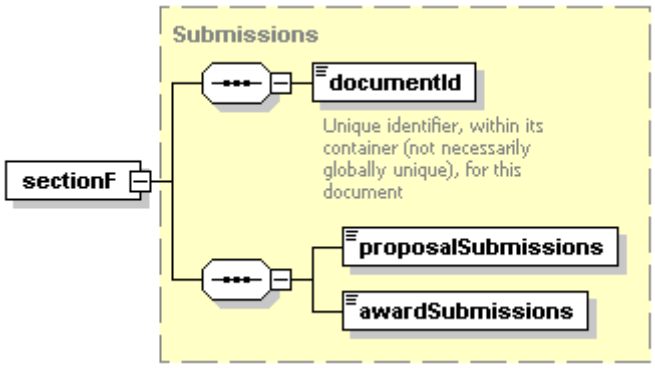
properties
isRef 0
content complex

children **documentId** **procedures** **evaluationCriteria**

source
```
<xs:element name="sectionE" type="EvaluationCriteria"/>
```

element **RequestForProposal/sectionF**

diagram



type **Submissions**

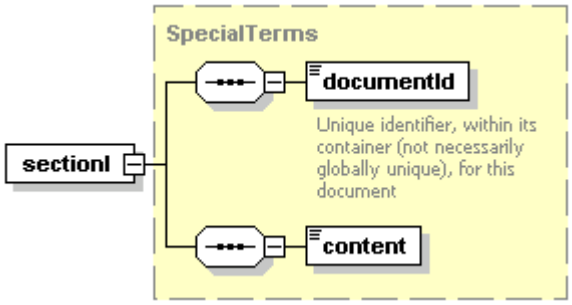
properties
isRef 0
content complex

children **documentId** **proposalSubmissions** **awardSubmissions**

source
```
<xs:element name="sectionF" type="Submissions"/>
```

element **RequestForProposal/sectionI**

diagram



type **SpecialTerms**

properties
isRef 0
content complex

children **documentId** **content**

source
```
<xs:element name="sectionI" type="SpecialTerms"/>
```

F.38. Types/Solicitation

Documents/SolicitationAdvertisingAnnouncement.xsd

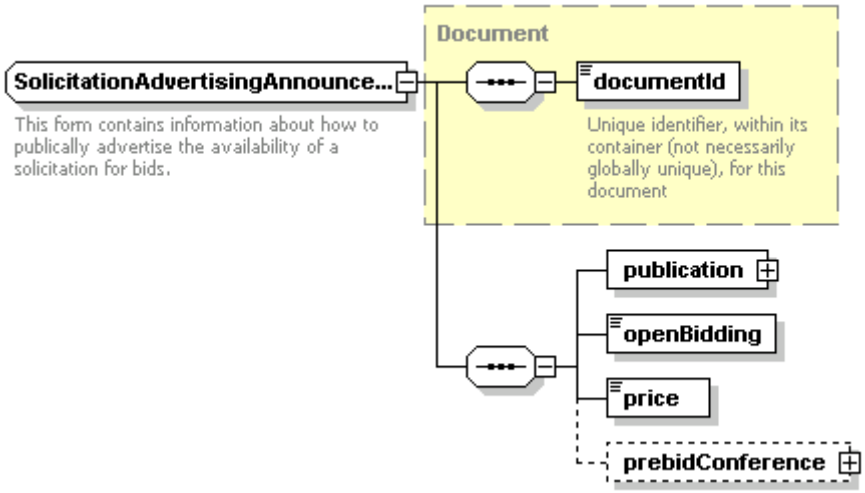
schema location: **types\SolicitationDocuments\SolicitationAdvertisingAnnouncement.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types

SolicitationAdvertisingAnnouncement

complexType **SolicitationAdvertisingAnnouncement**

diagram



type extension of Document

properties
- base Document

children documentId publication openBidding price prebidConference

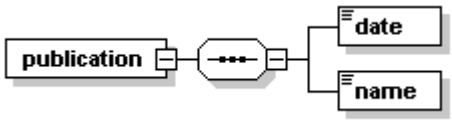
annotation
- documentation This form contains information about how to publically advertise the availability of a solicitation for bids.

source

```
<xs:complexType name="SolicitationAdvertisingAnnouncement">
 <xs:annotation>
  <xs:documentation>This form contains information about how to publically advertise the availability of a solicitation for bids.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="publication">
     <xs:complexType>
      <xs:sequence>
       <xs:element name="date" type="xs:date"/>
       <xs:element name="name" type="xs:string"/>
      </xs:sequence>
     </xs:complexType>
    </xs:element>
    <xs:element name="openBidding" type="xs:dateTime"/>
    <xs:element name="price" type="xs:decimal"/>
    <xs:element name="prebidConference" type="PreSubmissionConference" minOccurs="0"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **SolicitationAdvertisingAnnouncement/publication**

diagram



properties
- isRef 0
- content complex

children **date** **name**

source
```
<xs:element name="publication">
 <xs:complexType>
  <xs:sequence>
   <xs:element name="date" type="xs:date"/>
   <xs:element name="name" type="xs:string"/>
  </xs:sequence>
 </xs:complexType>
</xs:element>
```

element **SolicitationAdvertisingAnnouncement/publication/date**

diagram 

type **xs:date**

properties
isRef	0
content	simple

source
```
<xs:element name="date" type="xs:date"/>
```

element **SolicitationAdvertisingAnnouncement/publication/name**

diagram 

type **xs:string**

properties
isRef	0
content	simple

source
```
<xs:element name="name" type="xs:string"/>
```

element **SolicitationAdvertisingAnnouncement/openBidding**

diagram 

type **xs:dateTime**

properties
isRef	0
content	simple

source
```
<xs:element name="openBidding" type="xs:dateTime"/>
```

element **SolicitationAdvertisingAnnouncement/price**

diagram 

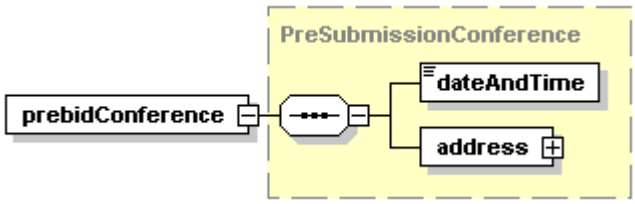
type **xs:decimal**

properties
isRef	0
content	simple

source
```
<xs:element name="price" type="xs:decimal"/>
```

element **SolicitationAdvertisingAnnouncement/prebidConference**

diagram



type	**PreSubmissionConference**
properties	isRef 0 content complex
children	**dateAndTime** **address**
source	<xs:element name="prebidConference" type="PreSubmissionConference" minOccurs="0"/>

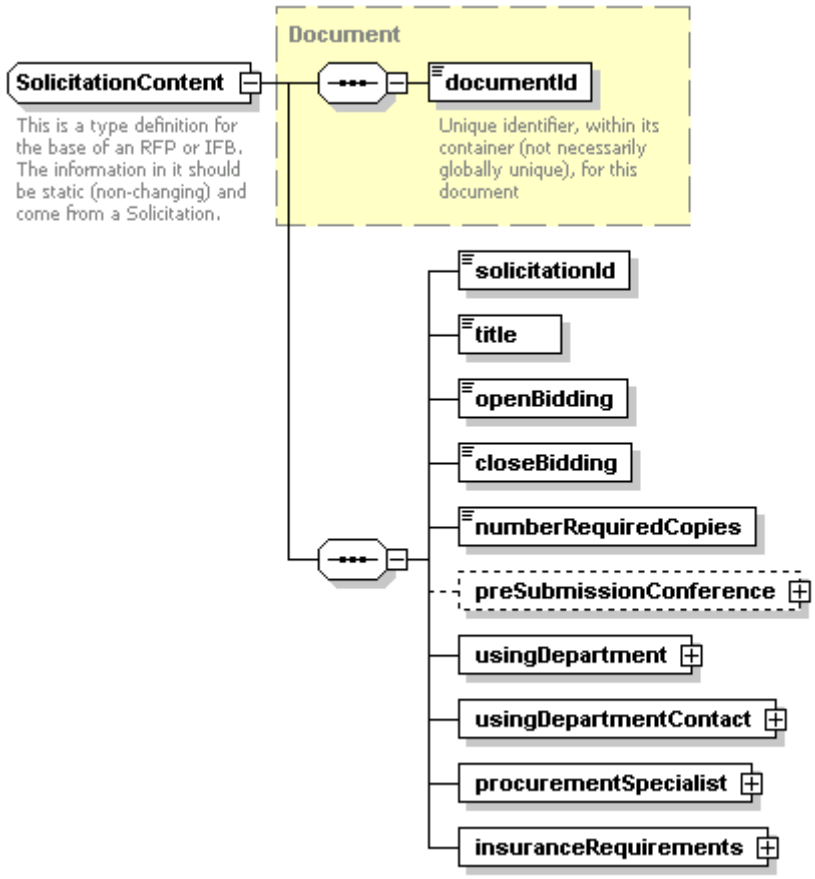
F.39. Types/Solicitation Documents/SolicitationContent.xsd

schema location: **types\SolicitationDocuments\SolicitationContent.xsd**
attribute form default: **unqualified**
element form default: **qualified**

Complex types
SolicitationContent

complexType **SolicitationContent**

diagram



type extension of **Document**

properties
- base Document

children **documentId** **solicitationId** **title** **openBidding** **closeBidding** **numberRequiredCopies** **preSubmissionConference** **usingDepartment** **usingDepartmentContact** **procurementSpecialist** **insuranceRequirements**

annotation
- documentation This is a type definition for the base of an RFP or IFB. The information in it should be static (non-changing) and come from a Solicitation.

source

```
<xs:complexType name="SolicitationContent">
 <xs:annotation>
  <xs:documentation>This is a type definition for the base of an RFP or IFB. The information in it should be static (non-changing) and come from a Solicitation.</xs:documentation>
 </xs:annotation>
 <xs:complexContent>
  <xs:extension base="Document">
   <xs:sequence>
    <xs:element name="solicitationId" type="SolicitationId"/>
    <xs:element name="title" type="xs:string"/>
    <xs:element name="openBidding" type="xs:dateTime"/>
    <xs:element name="closeBidding" type="xs:dateTime"/>
    <xs:element name="numberRequiredCopies" type="xs:positiveInteger"/>
    <xs:element name="preSubmissionConference" type="PreSubmissionConference" minOccurs="0"/>
    <xs:element name="usingDepartment" type="Department"/>
    <xs:element name="usingDepartmentContact" type="Employee"/>
    <xs:element name="procurementSpecialist" type="Employee"/>
    <xs:element name="insuranceRequirements" type="InsuranceRequirements"/>
   </xs:sequence>
  </xs:extension>
 </xs:complexContent>
</xs:complexType>
```

element **SolicitationContent/solicitationId**

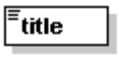
diagram 

type **SolicitationId**

properties
isRef 0
content complex

source
```
<xs:element name="solicitationId" type="SolicitationId"/>
```

element **SolicitationContent/title**

diagram 

type **xs:string**

properties
isRef 0
content simple

source
```
<xs:element name="title" type="xs:string"/>
```

element **SolicitationContent/openBidding**

diagram 

type **xs:dateTime**

properties
isRef 0
content simple

source
```
<xs:element name="openBidding" type="xs:dateTime"/>
```

element **SolicitationContent/closeBidding**

diagram 

type **xs:dateTime**

properties
isRef 0
content simple

source
```
<xs:element name="closeBidding" type="xs:dateTime"/>
```

element **SolicitationContent/numberRequiredCopies**

diagram 

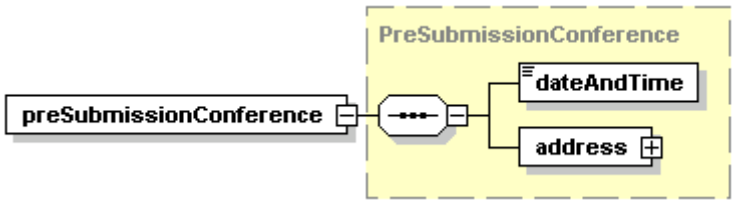
type **xs:positiveInteger**

properties
isRef 0
content simple

source
```
<xs:element name="numberRequiredCopies" type="xs:positiveInteger"/>
```

element **SolicitationContent/preSubmissionConference**

diagram



type **PreSubmissionConference**

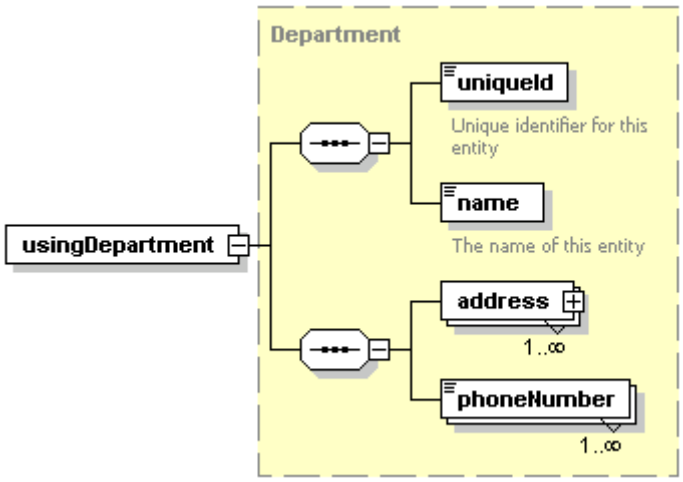
properties
isRef 0
content complex

children **dateAndTime** **address**

source
```
<xs:element name="preSubmissionConference" type="PreSubmissionConference" minOccurs="0"/>
```

element **SolicitationContent/usingDepartment**

diagram



type **Department**

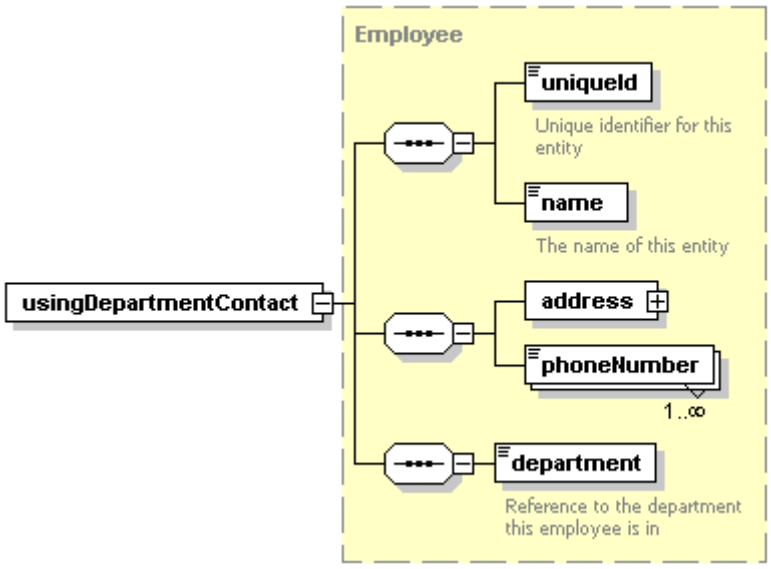
properties
isRef 0
content complex

children **uniqueId** **name** **address** **phoneNumber**

source
```
<xs:element name="usingDepartment" type="Department"/>
```

element **SolicitationContent/usingDepartmentContact**

diagram



type **Employee**

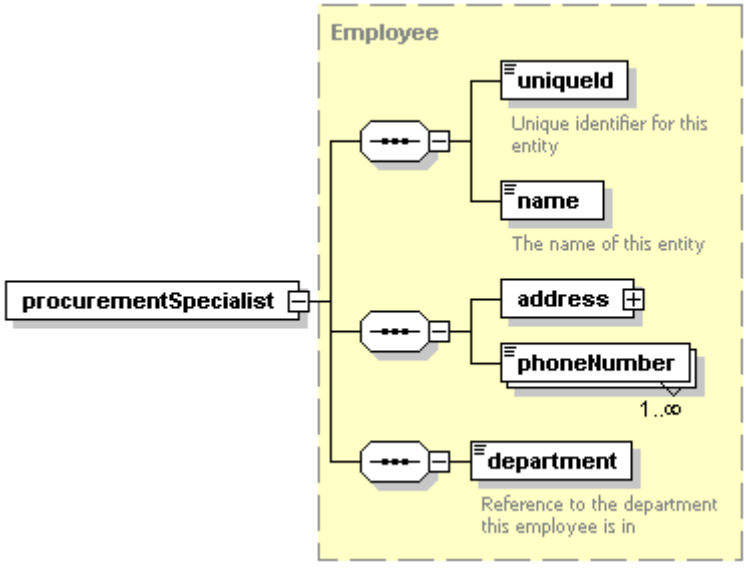
properties
isRef 0
content complex

children **uniqueId** **name** **address** **phoneNumber** **department**

source
```
<xs:element name="usingDepartmentContact" type="Employee"/>
```

element **SolicitationContent/procurementSpecialist**

diagram



type **Employee**

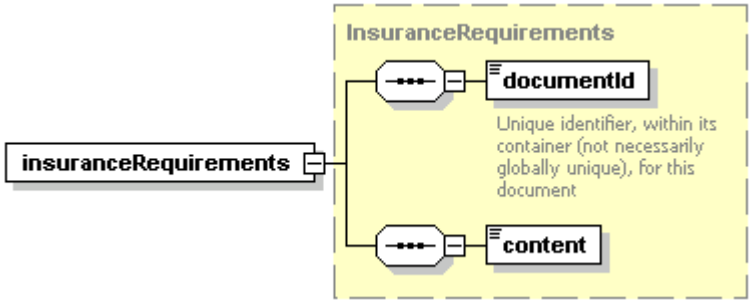
properties
isRef 0
content complex

children **uniqueId** **name** **address** **phoneNumber** **department**

source <xs:element name="procurementSpecialist" type="Employee"/>

element **SolicitationContent/insuranceRequirements**

diagram



type **InsuranceRequirements**

properties
isRef 0
content complex

children **documentId** **content**

source <xs:element name="insuranceRequirements" type="InsuranceRequirements"/>

Appendix G Performance Metrics

G.1. Overall Procurement Process

G.1.1. Draft Montgomery Measures Up! Page

PROCUREMENT

PROGRAM:	PROGRAM ELEMENT:
Overall Procurement Process	

PROGRAM MISSION:

COMMUNITY OUTCOMES SUPPORTED:

PROGRAM MEASURES	FY02 ACTUAL	FY03 ACTUAL	FY04 ACTUAL	FY05 BUDGET	06 TARGE @ MARC
Outcomes/Results:					
Percent of using departments satisfied with goods or services acquired					
Service Quality:					
Average bidder satisfaction with the procurement process					
Average vendor satisfaction with the procurement process					
Total complaints received about the procurement process					
Average time to complete a procurement (from receiving initiating memo to signing of contract)					
Bridge					
Open					
Non-competitive					
Public entity					
Small purchase					
Mini contract					
Competitive Sealed Proposal (RFP)					
Competitive Sealed Bid (IFB)					
Average for all types					
Average using department satisfaction with the procurement process					
Percentage of procurements taking longer than X weeks to complete					
Efficiency:					
Average number of solicitations per procurement specialist					
Average number of contracts managed per procurement specialist					
Average contract management cost per contract managed					
Average procurement cost per contract awarded					
Overall average cost per contract awarded					
Workload/Outputs:					
Total solicitations processed					
Total bids received					
Total contracts awarded					
Bridge					
Open					
Non-competitive					
Public entity					
Small purchase					
Competitive Sealed Proposal (RFP)					
Competitive Sealed Bid (IFB)					
Average for all types					
Total contracts managed by procurement specialists					
Inputs:					
Expenditures ($000)					
Work-years					
Number of procurement specialists					
Paper usage					

G.1.2. Outcomes/Results

Percent of using departments satisfied with goods or services acquired
Method: Ask the using department to rate their satisfaction with the good/service procured on a 0 to 10 scale for this procurement after the contract is completed
Rationale: Currently, the Office does not have a consistent, formal way of determining if using departments had a positive experience with the procurement process. By asking this question, the Office can determine if it is frustrating the using departments, or in any other way not serving them in the best possible way. The results would also have a positive aspect, so instead of simply reporting how many negative results are received, as is the case with reporting the number of complaints, the Office would know how many content customers it has dealt with. The answers to this question also indicate if the department found the vendor's work acceptable, which in turn indicates that the Office, the County Attorney, and other entities did well in preparing the contract, selecting the vendor, and performing the rest of the procurement process.

G.1.3. Service Quality

Average bidder satisfaction with the procurement process
Method: When bidders submit their bids to the Office, the Office could request, or require, that they answer a question such as, "How do you rate your experience with this solicitation on a scale of 0 to 10?"
Rationale: The result is numeric, and thus quickly and easily able to be evaluated, and it can show trends over time. The question is quick and easy to answer, so results should be consistent and many responses should be received. The answers could be collected electronically, minimizing costs in gathering the data.

Average vendor satisfaction with the procurement process
Method: When the contract is completed, and all goods, services, or construction received, the vendor will be asked to rate its experience with the procurement process on a 0 to 10 scale.
Rationale: The data is easy to gather and evaluate, even more easy to gather if it is done electronically. The results will show if vendors are satisfied with the procurement system, and show trends over time of this satisfaction.

Total complaints received about the procurement process
Method: Count the number of complaints received about the procurement process.
Rationale: The number of complaints received is directly proportional to the service quality of the Office. It is an easy piece of information to get, and it will show trends.

Average time to complete a procurement (from receiving initiating memo to signing of contract)
Method: Measure the time between when the Office received the initiating memo to when the using department and the selected vendor sign the contract. Perform this measurement for each type of solicitation: • Bridge • Open • Non-Competitive • Public Entity • Small Purchase • Mini-Contract • Competitive Sealed Proposal (RFP) • Competitive Sealed Bid (IFB)
Rationale: This measure covers the entire procurement process, giving one solid number that can be quickly evaluated by those who are not immediately interested in the low level details. By providing averages for each different type of solicitation, averages between different types can also be compared and questions about large disparities, if they exist, can be raised.

Average using department satisfaction with the procurement process
Method: When the contract is signed, the using department will be asked to rate its experience with the procurement process on a 0 to 10 scale, 10 being the best. If they choose to do so, the department can also provide comments explaining why it gave this rating.
Rationale:

One of the goals of the Office of Procurement is provide goods, services, and construction in a timely and efficient manner. Using this very simple, quick, and easy rating system, the Office can determine how well it is performing its function. Because the result is numeric data, the results are easy to evaluate, and trends can be easily noticed. Furthermore, if the question is posed via email or in some other electronic way, the Office will not have to dedicate many resources or much effort to gathering the data. The department could also be required to respond before the contract is executed, which would make the response rate very high.

Percentage of Procurements taking longer than X weeks to complete
Method: Count the number of procurement that take more than X weeks to be completed (the contract is signed).
Rationale: If the Office sets X to an acceptable period of time for procurements to be completed, for example, 5 weeks, this measure will show how many procurements take too long.

G.1.4.Efficiency

Average number of solicitations per procurement specialist
Method: Take the total number of solicitations and divide by the total number of procurement specialists.
Rationale: This measure is intended to show the workload of the Office. However, it may not be an accurate indicator. A decrease in the number of solicitations, due to a temporary dip in requests, may decrease this number leading some to conclude that there are too many procurement specialists. Another example of inaccuracy could occur if the Office declares that it needs more specialists, while this number remains constant, leading some to conclude that the request is not warranted. However, the Office may need these new people because the complexities of requests have gone up.

Average number of contracts managed per procurement specialist
Method: Count the number of contracts managed per specialist, and then average these results.
Rationale:

If a specialist manages too many contracts, he/she cannot effectively carry the same solicitation workload. This measure is a way of determining if the specialists are carrying too many contracts to also perform their duties regarding solicitations. Similar to the previous measure, however, this measure may also be misleading due to ignorance of the complexity of the contracts.

Average contract management cost per contract managed
Method: Total the value of all work done by the Office managing a contract after it is signed.
Rationale: How many Office resources are going into managing contracts is a very useful piece of information, as it shows what resources cannot be used to generate new solicitations.

Average procurement cost per contract awarded
Method: Find what the value of Office work, such as person-hours, per contract awarded, up to the signing of the contract, and then average those results.
Rationale: An awarded contract is a final outcome of the procurement process, so knowing what resources go into a completed product will help in the evaluation of the Office's performance.

Overall average cost per contract awarded
Method: Find out the value of Office work, such as person-hours, per contract awarded, through to the end of the contract's term, and then average those results.
Rationale: This measure and the previous one together can measure the costs of completed procurements. This measure evaluates the total cost, right through the end, of a contract. Comparing this total cost to the previous measure's results will yield the overhead in managing a contract, and how that management cost compares to the actual procurement process cost.

G.1.5. Workload/Outputs

Total solicitations processed
Method: Count the total number of solicitations processed by the Office.

Rationale:

Knowing the workload of the Office is valuable in evaluating its performance, and this measure provides one key component of that workload.

Total bids received

Method:

Count the number of bids received during advertisement of all applicable types of solicitations.

Rationale:

Bids take resources and time to evaluate, so they are a significant part of the workload. Also, an increase in the number of bids could indicate that more vendors are bidding, which in turn could mean that more vendors are having a positive experience with the Office and are choosing to bid more often.

Total contracts awarded for each of the following types of procurement:

- **Bridge**
- **Open**
- **Non-competitive**
- **Public entity**
- **Small purchase**
- **Mini contract**
- **Competitive Sealed Proposal (RFP)**
- **Competitive Sealed Bid (IFB)**

Method:

Count the number of contracts awarded for each solicitation type.

Rationale:

The breakdown by solicitation type will show what the most common types of solicitations are, as well as if some types are used extremely rarely and are perhaps not useful. Trends could also appear indicating that the Office and using departments are taking advantage of less costly, more appropriate solicitation types instead of always performing the same type out of habit.

Total contracts managed by procurement specialists

Method:

Count the total number of contracts managed by all procurement specialists.

Rationale:

Management of contracts is one function of the Office, so knowing how many contracts it manages shows how much work it is doing. However, this measure does not consider difficulty. For example, the number of contracts managed may decrease between two years, but the effective work stay the same because many easier contracts ended but a few contracts that are more difficult began.

G.1.6. Inputs

Expenditures ($000)

Method:

Discover how much money the Office spent for all resources.

Rationale:

Knowing exactly how much the Office spent is clearly an important performance indicator.

Work-years

Method:

One work year is the amount of working time one full time person works in one year. Find out how many work-years the Office staff dedicated in this time period.

Rationale:

The "Montgomery Measures Up!" document has this measure as a standard item in all lists.

Number of procurement specialists

Method:

Count the number of procurement specialists working at the Office.

Rationale:

The procurement specialists do the work of the Office, so this number is an important measure to keep track of.

Paper usage

Method:

Find out how much paper the Office uses each year. This information can be acquired by looking at paper orders.

Rationale:

The amount of paper the Offices uses is related to how much work the employees do electronically. Therefore, as the BPMS is installed, the paper use should decrease. If it does not, one can infer that work is being duplicated both electronically and on paper, and research into why this situation exists is required. The County also has a policy of reducing the amount of paper it uses for environmental reasons, so this measure is a good indicator of the Office's progress on that policy.

G.2. Solicitation and Award Process

G.2.1. Draft Montgomery Measures Up! Page

PROCUREMENT

PROGRAM:	PROGRAM ELEMENT:
Solicitation and Award Process	

PROGRAM MISSION:

COMMUNITY OUTCOMES SUPPORTED:

PROGRAM MEASURES	FY02 ACTUAL	FY03 ACTUAL	FY04 ACTUAL	FY05 BUDGET	06 TARGE @ MARC
Outcomes/Results:					
Percent of using departments satisfied with goods or services acquired					
Service Quality:					
Solicitation Process					
Average time to complete department solicitation actions (provision of intially required documents, etc.)					
Average time to complete MFD Compliance process					
Average time to complete bonds process					
Average time for CRC to review a non-competitive bid					
Average time for Procurement to finalize the solicitation (from receipt of initiating memo to...)					
Bridge (when contract execution occurs)					
Open (when advertising starts)					
Non-competitive (when contract is signed)					
Public entity (when contract is signed)					
Small purchase (when contract is signed)					
Mini contract (when contract is signed)					
Competitive Sealed Proposal (RFP) (when advertising starts)					
Competitive Sealed Bid (IFB) (when advertising starts)					
Average for all types					
Award Process					
Average time for a department to recommend an awardee after the reception of bids for an RFP					
Average time for Procurement to provide the list of the 3 lowest bidders to the department once the bids are opened for an IFB					
Average time for using department to select a vendor after receiving the list of the 3 lowest bidders for an IFB					
Average time from Procurement's receipt of the vendor recommendation to Office of Procurement’s Approval					
Overall average time from advertising closing date to contract signing					
Ratio of Procurement solicitation and award process time to using department solicitation and award processing time					
Average using department satisfaction with the procurement process					
Average bidder satisfaction with the procurement process					
Number of complaints received regarding the solicitation/award process from using departments					
Number of complaints received regarding the solicitation/award process from bidders/vendors					
Percentage of solicitations that need to be redone					
Efficiency:					
Average number of solicitations per procurement specialist					
Average Procurement Office cost per solicitation					

PROCUREMENT					
PROGRAM: Solicitation and Award Process			**PROGRAM ELEMENT:**		
PROGRAM MISSION:					
COMMUNITY OUTCOMES SUPPORTED:					
PROGRAM MEASURES	**FY02 ACTUAL**	**FY03 ACTUAL**	**FY04 ACTUAL**	**FY05 BUDGET**	**06 TARGE @ MARC**
Workload/Outputs:					
Total solictiations processed					
Bridge					
Open					
Non-competitive					
Public entity					
Small purchase					
Mini contract					
Competitive Sealed Proposal (RFP)					
Competitive Sealed Bid (IFB)					
Total					
Solicitations cancelled					
Solicitations redone					
Total bids received					
Number of pre-bid conferences held					
Inputs:					
Expenditures ($000)					
Workyears					
Number of procurement specialists					

G.2.2. Outcomes/Results

Percent of using departments satisfied with goods or services acquired
Method: Ask the using department to rate their satisfaction with the good/service procured on a 0 to 10 scale for this procurement after the contract is completed
Rationale:

Currently, the Office does not have a consistent, formal way of determining if using departments had a positive experience with the procurement process. By asking this question, the Office can determine if it is frustrating the using departments, or in any other way not serving them in the best possible way. The results would also have a positive aspect, so instead of simply reporting how many negative results are received, as is the case with reporting the number of complaints, the Office would know how many content customers it has dealt with. The answers to this question also indicate if the department found the vendor's work acceptable, which in turn indicates that the Office, the County Attorney, and other entities did well in preparing the contract, selecting the vendor, and performing the rest of the procurement process.

G.2.3.Service Quality

G.2.3.1. Solicitation Process

Average time to complete department actions (provisions of initially required documents, etc)
Method: Measure the time between when the initiating memo is received and when the procurement specialist decides that he/she has all required documentation from the using department.
Rationale: One source of potential delay in the procurement process is at the beginning, as the Office attempts to get all required information from the using department to proceed with the solicitation. This metric provides a way of showing how much time is spent in delaying the solicitation by the using department.

Average time to complete MFD Compliance Process
Method: Measure the time from when the MFD procurement specialist is contacted until all MFD solicitation processes are completed.
Rationale: This is a potential step in the solicitation process when time can be lost. It is place that should be further investigated.

Average time to complete bonds processes
Method:

Measure the time from when the Risk Management department is contacted about the bonds process until all bond requirements are met.

Rationale:

Obtaining all bond requirements from Risk Management is a step in the solicitation process that must be addressed. A delay in obtaining bonds leads to a delay as to when the contract is signed.

Average time for CRC to review a non-competitive bid

Method:

Measure the time between when the CRC receives the bid to when they reach a decision to approve or reject it.

Rationale:

The CRC decision process is a potential bottleneck, so by learning how long it takes, and seeing trends in time, changes to the CRC decision process could be make to improve the procurement process.

Average time for Procurement to finalize the solicitation

Method:

Measure the time between when the initiating memo is received to the end of the solicitation process. Below is a listing of when solicitation ends for each type of procurement

- Bridge: when contract execution occurs
- Open: when advertising starts
- Non-competitive: when contract is signed
- Public entity: when contract is signed
- Small purchase: when contract is signed
- Mini contract: when contract is signed
- Competitive Sealed Proposal (RFP): when advertising starts
- Competitive Sealed Bid (IFB): when advertising starts

Rationale:

As one of the major phases in procurement, measuring changes over time in how long is spent in the solicitation process can dictate where the Office needs to focus its efforts in optimizing procurements.

G.2.3.2. Award Process

Average time for a department to recommend an awardee after the reception of bids for an RFP

Method:

When the bids are received by the Office, they are given to the using department who recommends the winner. Measure the time it takes from the using department receives the bids to when they return their suggested awardees to the Office.

Rationale:

This part of the process occurs entirely in the hands of the using department. Therefore, by using this metric, the Office can tell how much time is spent in the procurement process beyond the Office's control.

Average time for Procurement to provide the list of the 3 lowest bidders to the department once the bids are opened for an IFB

Method:

Measure the time between the end of the advertising period to when the Office of Procurement determines the three lowest bids.

Rationale:

We believe this period should be very short, as the three lowest bids only need to be delivered to the using department. However, we suspect that this part may be longer than necessary, and could be monitored over time to determine if improvement is warranted.

Average time for using department to select a vendor after receiving the list of the 3 lowest bidders for an IFB

Method:

When the bids are received by the Office, the three lowest are given to the using department who recommends the winner. Measure the time it takes from the using department receives the bids to when they return their suggested awardee to the Office.

Rationale:

This part of the process occurs entirely in the hands of the using department. Therefore, by using this metric, the Office can tell how much time is spent in the procurement process beyond the Office's control.

Average time from Procurement's receipt of the vendor recommendation to the Office of Procurement's Approval

Method:

Measure the time between when the Office receives the recommended awardee list from the using department to when it is approved by the Director of the Office of Procurement.

Rationale:

Approving the using department's selection of an awardee is a crucial and final step in the procurement process. It also involves the Director, who could be easily overcome by work, causing a bottleneck. By using this metric, the Office could determine if this bottleneck exists and monitor it over time to fix it or prevent it from becoming a problem.

Overall average time from advertising closing date to contract signing
Method: Measure the time between advertising closing date to when the contract is signed.
Rationale: This will give a summary of the time spent for the award process. It will be a good figure for Council to look at.

G.2.3.3. General

Ratio of Procurement solicitation and award process time to using department solicitation and award processing time
Method: Measure the time the bids spend in the Office's hands versus the time spent in the using department's hands between when the bids are received until the contract is signed.
Rationale: As changes are made to the procurement process, from the introduction of a BPMS to changes in legislation, this ratio should decrease, indicating improvements to the process. The ratio is a relatively easy way to learn if changes are having a positive or negative impact on the Office.

Average using department satisfaction with the procurement process
Method: Ask the using department to rate their experience with the Office on a 0 to 10 scale for this procurement after the contract is signed.
Rationale: By asking the using department to rate its satisfaction just after the contract is signed, and not after the good is received or service is performed, provides an indication strictly of the department's feelings on the procurement process, not on the vendors work. This information can be used to decide if the process needs to be optimized, and how many content or discontent departments the Office has dealt with.

Average bidder satisfaction with the procurement process
Method: Ask the bidders to rate their satisfaction on a 0 to 10 scale with their procurement experience when they submit their bids for consideration.
Rationale: Content bidders are more likely to return to bid again, while disgruntled ones will not go through the trouble. Therefore, measuring bidder content is valuable to the Office.

Number of complaints received regarding the solicitation/award process from using departments
Method: Count the number of complaints using departments.
Rationale: The Office clearly wants its users to be content with the process, so this metric is an easy way of measuring how pleased using departments are with the Office. This information may be measured separately for each of the using department, as they might have different reasons to file complaints.

Number of complaints received regarding the solicitation/award process from bidders/vendors
Method: Count the number of complaints from bidders/vendors.
Rationale: The Office clearly wants its users to be content with the process, so this metric is an easy way of measuring how pleased bidders/vendors are with the Office. This information may be measured separately for each of the bidders/vendors, as they might have different reasons to file complaints.

Percentage of solicitations that need to be redone
Method: Count the number of solicitations that need to be redone because they did not receive any bids or the bids were wrong (the solicitation did not state the goods/services clearly enough to get good bids).
Rationale:

The number of "bad" solicitations shows how well the using the departments are writing their procurement requests and how well the procurement specialists and county attorney are reviewing them.

G.2.4.Efficiency

Average number of solicitations per procurement specialist
Method: Count the number of solicitations completed by each specialist.
Rationale: Knowing how many procurements each specialist completes per year is a valuable piece of information. This information could indicate that one specialist is too specialized and only deals with rare procurements; they could better be utilized if they assisted in another area in addition to their specialization. It can also show how well the specialists are adapting to changes, such as new technologies. For example, some specialists will show an increased number of completed solicitations following BPMS introduction, while others may take longer to show that improvement.

Average Procurement Office cost per solicitation
Method: Determine the average cost for each solicitation.
Rationale: This will be a good way of recognizing how much cost goes into each solicitation process. This figure will also be a good reference for county citizens and council to see where money is being spent.

G.2.5.Workload/Outputs

Total Solicitations Processed for each of the following types of procurement:

- **Bridge**
- **Open**
- **Non-competitive**
- **Public entity**
- **Small purchase**
- **Mini contract**
- **Competitive Sealed Proposal (RFP)**
- **Competitive Sealed Bid (IFB)**

Method:

Count the number of solicitations completed by the Office.

Rationale:

Positive changes in the procurement process, such as the introduction of a BPMS or simplification of procurement regulations, should see this number increase, indicating improved efficiency. This metric is an easy to calculate way of determining if the Office is improving or not as a function of time.

Solicitations cancelled

Method:

Count of the number of cancelled solicitations.

Rationale:

This will give an insight into how many solicitation are processed, but are not fully carried out. This might be an area where much time money is spend, but with no outcome.

Solicitations redone

Method:

Count the number of solicitations that need to be redone because they did not receive any bids or the bids were wrong (the solicitation did not state the goods/services clearly enough to get good bids).

Rationale:

The number of "bad" solicitations shows how well the using the departments are writing their procurement requests and how well the procurement specialists and county attorney are reviewing them.

Total bids received

Method:

Count the total number of bids received.

Rationale:

Although not all bids are awarded a contract, each bid needs to be opened, read, and tabulated. This step takes time, effort, and money which make this measure a notable one.

Number of pre-bid conferences held

Method: Count the number of pre-bid conference held for potential bidders.
Rationale: Conferences take a lot of money, time and effort to plan and execute. The expenditures should be taken into consideration when observing the entire procurement process.

G.2.6.Inputs

Expenditures ($000)
Method: Discover how much money the Office spent for all resources.
Rationale: Knowing exactly how much the Office spent is clearly an important performance indicator.

Work-years
Method: One work year is the amount of working time one full time person works in one year. Find out how many work-years the Office staff dedicated in this time period.
Rationale: The “Montgomery Measures Up!” document has this measure as a standard item in all lists.

Number of procurement specialists
Method: Count the number of procurement specialists working at the Office.
Rationale: The procurement specialists do the work of the Office, so this number is an important measure to keep track of.

Appendix H Glossary of Terms

ADPICS (Advanced Procurement Inventory Control System) – A purchasing and accounts payable system used to create requisitions, purchase orders, and issue vouchers for payment.

Buyer – (see Procurement Specialist)

Construction – The erection, alteration, repair, demolition or renovation (including dredging, excavating, landscaping and painting) of roads, public buildings, structures or other improvements to real property. Construction does not include routine maintenance, operation or repair of existing facilities.

Contract Administrator – an authorized official in a using department with the responsibility of administering a contract.

Contractor – Any individual or organization doing business with the County whether for services, construction, or for the sale of goods or services pursuant to a contract.

Contract Review Committee (CRC) – A standing committee established for such purposes as specified in law or these regulations.

Goods – Supplies, materials, equipment, and all other tangible commodities, except real property.

Invitation for Bid (IFB) – A formal solicitation in which competitive sealed bids are invited through a public notice procedure which requires that bids be received by a specified time and opened publicly. Invitations for Bids are evaluated solely in terms of bidder responsibility, bidder responsiveness, and price.

MFD – An abbreviation used for minority, female, or disabled owned businesses as defined in Chapter 11B of the County Code.

The Office – The Montgomery County Office of Procurement

Performance Metric – A unit of measure to gauge an organization's performance and have a standard to improve.

Procurement – Buying, purchasing, or otherwise acquiring goods, services, or construction. It also includes all functions that pertain to the obtaining of any goods, service, or construction, including description of requirements, selection and solicitation of sources, evaluation of offers, preparation and award of contract, dispute and claim resolution, and all phases of contract administration.

Procurement Guide – A guide designed to assist procurement specialists, contract administrators, and other procurement professionals who purchase goods, services, and construction for Montgomery County.

Procurement – Buying, purchasing, or otherwise acquiring any goods, services, or construction. It also includes all functions that pertain to the obtaining of any goods, service, or construction, including description of requirements, selection and solicitation of sources, evaluation of offers, preparation and award of contract, dispute and claim resolution and all phases of contract administration.

Procurement Specialist – An individual within the Office of Procurement in charge of buying, purchasing, or otherwise acquiring any goods, services, or construction for the County.

Public Entity – A public entity is: (1) the federal, state and local governments or their agencies; (2) boards, commissions, or committees established by a federal, state, or local law; (3) government organizations or associations of the federal government, state governments, or political subdivisions of state governments; or (4) any other entity that both qualifies as a not-for-profit corporation under the provisions of the United States Internal Revenue

Code and which is incorporated by one of the preceding entities for the exclusive purpose of supporting or benefiting a public entity. See Chapter 11B, Montgomery County Code.

RAPID – A fee-based web application operated by the Office of Procurement. It is continuously updated, enabling subscribers to review, access, and download up-to-date procurement information.

Risk Management Insurance Requirements – All solicitations must include a form from the Department of Risk Management that lists all the insurance requirements that a vendor must fulfill.

Qualification And Selection Committee (QSC) – A committee established by a Using Department for the purpose of evaluating responses submitted by offerors in connection with an RFP or an REOI. Each member of the QSC must be an employee of a public entity, unless specific authorization is obtained from the CAO for another to serve on the committee. The committee must be composed of at least three members.

Request for Expressions of Interest (REOI) – A solicitation to prospective offerors, the response to which is to be analyzed in accordance with selection criteria set forth in the solicitation. The REOI is used to develop a shortlist of prospective offerors who are eligible to receive a subsequent solicitation such as an RFP or an IFB. Requests for Expressions of Interest are generally made where specifications cannot be prepared or the availability of vendors for the goods, services, or construction involved is uncertain or unknown.

Request for Proposal (RFP) – A solicitation to prospective offerors, the response to which is analyzed in accordance with selection criteria set forth in the solicitation for the purpose

of ranking the proposals received. A Request for Proposal is generally utilized (instead of an REOI) when specification can be prepared.

Solicitation – A process for requesting submittal of offers through either a formal communication, which may include an IFB, RFP or REOI, or an informal communication, such as telephone communication and other forms of communication with potential offerors as specifically authorized under these regulations. A solicitation may only be issued by a contracting officer or an authorized government official.

Using Department – Any County department, office, or agency subject to the procurement requirements imposed under Chapter 11B, Montgomery County Code.

Vendor – (see Contractor)

XML – XML (Extensible Markup Language) is a flexible way to create common information formats and share both the format and the data on the World Wide Web, intranets, and elsewhere.

XML Schema – An XML schema is a description of a type of XML document, typically expressed in terms of constraints on the structure and content of documents of that type, above and beyond the basic syntax constraints imposed by XML itself. An XML schema provides a view of the document type at a relatively high level of abstraction.

Appendix I Montgomery County Procurement Guide

This section contains an inserted copy of the Montgomery County Procurement Guide, which is inserted in printed format (not included in page numbers), or available electronically at: http://www.montgomerycountymd.gov/content/procurement/documents/proc_guide.pdf.