Memorandum

DATE January 13, 2012

TO   Honorable Members of the Budget, Finance & Audit Committee: Jerry R. Allen (Chair), Tennell Atkins (Vice Chair), Monica R. Alonzo, Scott Griggs, Ann Margolin

SUBJECT SAP Billing System Briefing

On Tuesday, January 17, 2012, you will be briefed on the SAP Billing System. The briefing material is attached for your review.

If you have questions or need additional information, please let me know.

Forest E. Turner
Assistant City Manager

Attachment

cc: Honorable Mayor and Members of the City Council
       Mary K. Suhm, City Manager
       Rosa A. Rios, Acting City Secretary
       Thomas P. Perkins, Jr., City Attorney
       Craig D. Kinton, City Auditor
       C. Victor Lander, Administrative Judge
       A.C. Gonzalez, First Assistant City Manager
       Ryan S. Evans, Assistant City Manager
       Jill A. Jordan, P.E., Assistant City Manager
       Joey Zapata, Assistant City Manager
       Jeanne Chipperfield, Chief Financial Officer
       Edward Scott, City Controller
       Stephanie Pegues-Cooper, Assistant to the City Manager

SAP Billing System

Briefing to Budget, Finance and Audit Committee
January 17, 2012

Overview of Today's Briefing

▸ Why did we need a new billing system?

▸ How did we implement the billing system?

▸ What did we accomplish?

▸ How have we supported the system?

▸ Where are we going and what are future plans?

▸ What lessons have we learned?

Why did we need a new billing system?

- The City's major billing system (CIABS) installed in 1986 (software and related hardware) for:
  - Water, wastewater and sanitation services, and storm water fees

- Was in a declining stage of life:
  - Challenging to implement system changes
  - Difficult to interface with other City systems
  - Utilized mainframe COBOL (extinct) environment

- Increased risks associated with potential system failure

How did we implement the billing system?

Steps for System Replacement Included:

▸ **12/13/2004** - Briefed Finance and Audit Committee on CIABS and the need and steps to replace it

▸ **1/12/2005** – Council awarded original contract to Jericho Consulting for following scope of work:

  ◦ **Prepare a business case examining three alternatives** to acquire new system:
    • Rewrite/Reengineer
    • Replace/Buy
    • Outsource

  ◦ **Prepare a Request for Competitive Sealed Proposal (RFCSP) for system replacement**

  ◦ **Perform other work awarded as supplemental additions to this contract**:
    • Data cleansing /conversion of over 18M data fields
    • Bill print analysis and implementation
    • Project implementation assistance
    • User acceptance testing

How did we implement the billing system?

- **10/24/2005** - Finance, Audit and Accountability Committee was briefed on the results of the business case and project approach

- **Recommendation: Prepare the RFCSP as Replace/Buy with alternative for outsourcing/hosting**

- RFCSP called for the replacement of:
  - Customer Information and Billing System (CIABS)
    - Water, Wastewater, Sanitation and Storm water services billing

  - Replacement of multiple mainframe and Excel-based desktop applications in 9 departments:

Dallas Police	Convention Center	Housing
Dallas Fire Rescue	Aviation	Economic Development
Code Compliance	Public Works/Transportation	Strategic Customer Service

How did we implement the billing system?

What was requested in the RFCSP:

▸ New state-of–the-art Customer Information System software solution

▸ Implementation vendor

▸ Outsourcing/hosting options

Results of RFCSP

10/09/2006 – Briefed Council committees on RFCSP results:

Software = SAP

▸ Provided comprehensive range of business applications

▸ Built on solid technical architecture, allowing integration of both SAP and non-SAP applications

▸ SAP software provided strategic opportunities to:
  ◦ Integrate other business functions beyond billing and collection
  ◦ For example: Capital planning and work order/asset management for DWU pipeline divisions

▸ As outdated City systems were targeted for replacement, SAP would be the "ruler" by which other specialty systems would be evaluated to determine:
  ◦ If SAP could meet departmental needs
  ◦ If City could standardize itself to core SAP processes

Note: See Appendix E for list of other utilities and companies using SAP

Results of RFCSP, continued

Implementer = Axon (HCL-Axon)

▸ Understood our core functional requirements

▸ Municipal-specific, utility-specific SAP template with best practices

▸ History of successful implementations

▸ Emphasis on business change management

▸ Managing organizational change, communication and training from Day 1

▸ Utilizing SAP software with CIS support and hosting

Results of RFCSP, continued

Support and Hosting = CIS Department

▸ CIS Department would provide basic services including:
  ◦ Software break/fix
  ◦ Data backups
  ◦ Hardware maintenance
  ◦ Security, database, and operating system administration

▸ Third party "SAP experts" would work with CIS for:
  ◦ Hardware refresh
  ◦ Software enhancements
  ◦ New SAP business applications
  ◦ Expanding the range of SAP business applications implemented at the City

Results of RFCSP, continued

- **10/25/06** – Council awarded implementation contracts for system replacement

- Estimated implementation costs (software, implementation resources, and hardware) in October 2006 - $26.5M

- A cost benchmark for SAP implementations by utilities (as provided by 2 industry leaders) is generally estimated based on the # of meters.
  - The range is typically $90 - $100 per meter.
  - Using these models, the City's implementation cost would range from $25.9M - $28.7M

- Implementation project began 11/6/06 and completed 11/17/08

How did we implement the billing system?

SAP Project Implementation Costs Planned vs. Actual (in millions)

Category	Planned	Actual	Variance
Staffing Resources	$22.6	$21.8	($0.8)
Software	$2.5	$4.5	$2.0
Hardware	$1.4	$1.5	$0.1
	$26.5	$27.7	$1.3

Variance is a result of increased software and hardware needs for:

Oracle Licensing – Additional licenses required for SAP

Veritas – Required to standardize hardware

Exstream – Software required for new bill design

Inventory System – Handheld scanners for DWU's inventory system

What did we accomplish?

SAP System Metrics:

▸ In FY 10-11 billing produced 4.1M invoices for:
  ◦ $742.7M = billed utilities revenues
  ◦ $103.3M = billed departmental revenues

▸ Steady increase of "paperless" customers
  ◦ FY 08-09 - 22,330
  ◦ FY 10-11 - 35,159

▸ Increase in value of online payments
  ◦ FY 08-09 $ 67.7 M (11% of utility revenue)
  ◦ FY 10-11 $113.1M (15% of utility revenue)

▸ 49% of City of Dallas utility payments are paid electronically
  ▸ 2010 Chartwell, Inc. study shows 34% of customers pay bills electronically

What did we accomplish?

The City's SAP system bills for 900+ fees for 14 departments. Some examples are:

- Dallas Water Utilities
  - Water, wastewater, miscellaneous fees
- Sanitation Services
  - Solid waste collection fees
- Dallas Police Department
  - Security alarm permit registration and false alarm fees (approximately 62,000 active)
  - Dance/billiard halls/amusement center and sexually oriented business licenses
  - Regulated property fees
  - Secondary metals recycling fees
- Dallas Fire Rescue
  - Hazmat fees, training and communications fees, high risk building inspections
- Code Compliance Services
  - Liens for land-based receivables, non-owner occupied rental property, consumer protection fees, multi-tenant registration and inspection fees

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What did we accomplish?

The City's SAP system bills for 900+ fees for 14 departments. Some examples are:

- Aviation
  - Landing fees, property leases, ground/terminal/baggage claim fees
- Convention Services
  - Hotel occupancy tax (261 accounts)
- Economic Development
  - Business loans
- Public Works/Transportation
  - Paving assessments; Air quality fees
- Housing
  - Home loans

What did we accomplish?

Additionally: SAP System Provides a Variety of Operational Efficiencies for Participating Departments:

▸ Use lockbox operations

▸ Comply with Payment Card Industry standards

▸ Reduce returned mail due to postal compliance

▸ Automate time and activity-driven dunning and collection efforts

▸ Use consolidated external delinquent collection efforts

▸ Create and update 1,200 service requests daily

▸ Maintain inventory for approximately 300,000 installed water meters

▸ Provide for service order costing

▸ Provide information to Sustainable Development & Construction, SCS Call Center, City Attorney's Office, Dallas County Appraisal District

What did we accomplish?

Lastly, but Most Importantly, We Have Created a Positive Customer Impact:

▸ Electronic billing and payment enhancements
  ◦ Pay invoices online using one time or recurring credit cards and checking/savings accounts
  ◦ View 13 month history of water usage
  ◦ Contact utility with questions/requests
  ◦ View utility bill inserts electronically

▸ Ability to target customer bill messaging
  ◦ Example: Sanitation's One Day Dallas campaign

▸ Bills provide detailed information
  ◦ Example: Pavement Assessment bill includes resolution number and project location

How have we supported the system?

Three Possible Models for Supporting IT Systems:

1. **Basic In-House Service Model includes:**
   ◦ Basic operations and maintenance of software and hardware
   ◦ Utilizes outside vendors to support significant enhancements and implementations

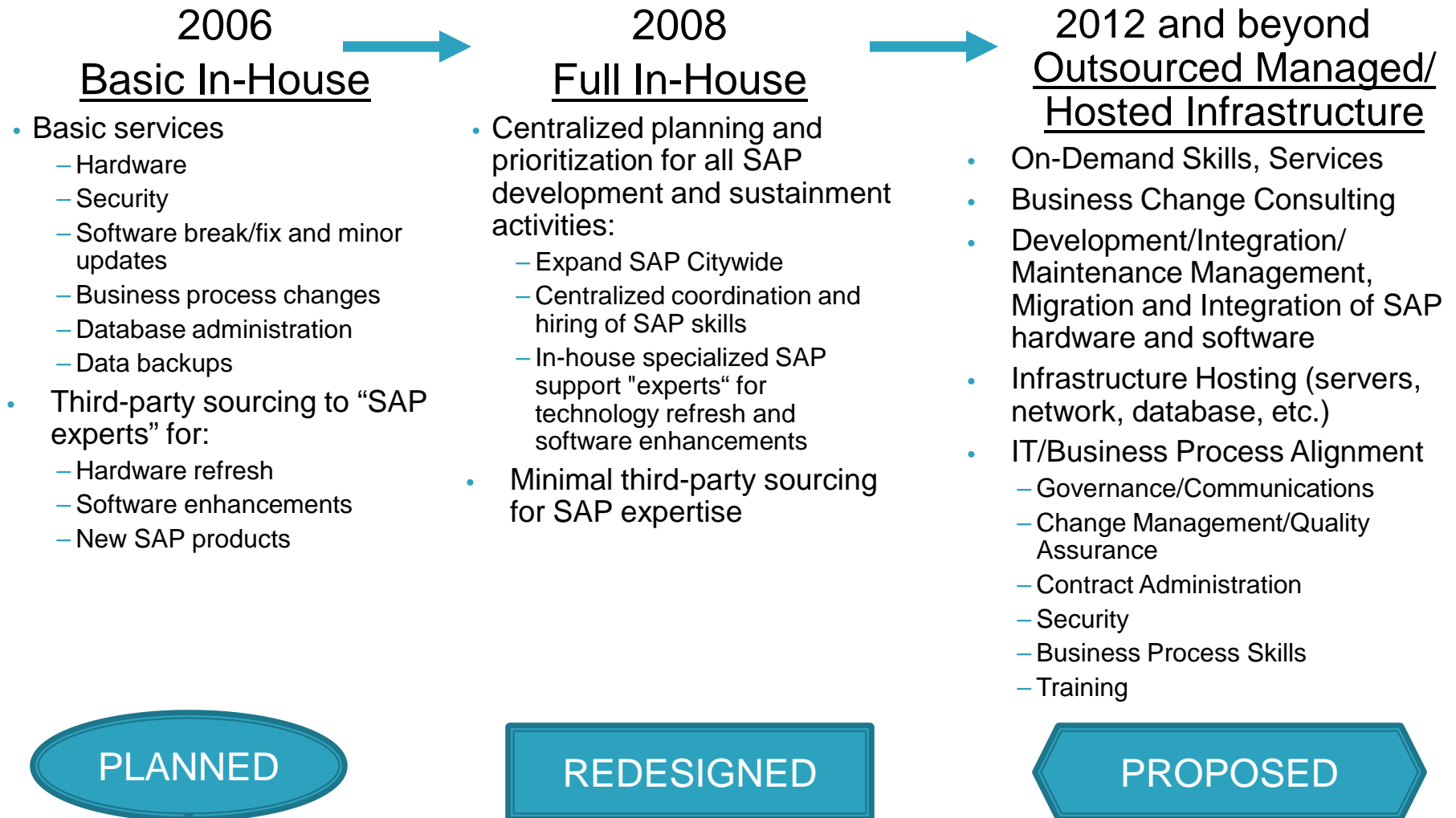2. **Full In-House Service Model includes:**
   ◦ All of the above for Basic In-House staff AND
   ◦ Adds in-house expertise to provide for implementation of significant enhancements
   ◦ Limits outside vendor contracting

3. **Outsourced Managed Service/Hosted Infrastructure Model includes:**
   ◦ Turns over operations and maintenance to vendor – allows for services on demand or as needed
   ◦ Allows for consistent staffing levels
   ◦ Requires vendor to meet specific service level agreements
   ◦ Maintains limited but important roles of contract compliance and day to day oversight for in-house staff

How have we supported the system?

City of Dallas Approach for Supporting SAP System:

2006
Basic In-House

- Basic services
  - Hardware
  - Security
  - Software break/fix and minor updates
  - Business process changes
  - Database administration
  - Data backups
- Third-party sourcing to "SAP experts" for:
  - Hardware refresh
  - Software enhancements
  - New SAP products

2008
Full In-House

- Centralized planning and prioritization for all SAP development and sustainment activities:
  - Expand SAP Citywide
  - Centralized coordination and hiring of SAP skills
  - In-house specialized SAP support "experts" for technology refresh and software enhancements
- Minimal third-party sourcing for SAP expertise

2012 and beyond
Outsourced Managed/ Hosted Infrastructure

- On-Demand Skills, Services
- Business Change Consulting
- Development/Integration/ Maintenance Management, Migration and Integration of SAP hardware and software
- Infrastructure Hosting (servers, network, database, etc.)
- IT/Business Process Alignment
  - Governance/Communications
  - Change Management/Quality Assurance
  - Contract Administration
  - Security
  - Business Process Skills
  - Training

PLANNED

REDESIGNED

PROPOSED

How have we supported the system?

- **10/09/06** - Briefing to Council Committees on implementation included:
  - Original support plan for basic system maintenance, estimated at $2.1M annually to be provided by CIS

- As part of the implementation, Axon provided a Support Readiness Assessment*
  - Summer 2008 - City of Dallas redesigned its strategy to be a Full In-House Service support organization and planned to become self-sufficient
  - CIS began restructuring to add capacity and skill sets to the basic support model for significant enhancements and expansion of SAP

- **11/10/08** – City Council awarded contract to HCL-Axon for the term 10/1/08 thru 9/30/10 to:
  - Assist CIS with system support and implementation of the Assessment recommendations in order to establish the Full In-House support model
    - Anticipated a 2 year period based on industry estimates for restructuring a technology organization
  - Success of this plan was highly dependent on CIS's ability to fill their positions

- **6/23/10** - Council approved an extension with HCL-Axon from 4/1/10 thru 10/31/11 to continue the support effort and provide CIS additional training time

*See Appendix D for Assessment/Service Model

SAP Support Costs, Planned vs. Actual (in millions)

	Planned	Actual	Variance
CIS Support	$8.4	$11.1	$2.7
HCL Axon Support	$0.0	$12.8	$12.8
Subtotal	$8.4	$23.9	$15.5
CIS Hosting	$2.9	$1.6	($1.3)
Total	$11.3	$25.5	$14.2

Average annual cost = $7.9M

- Budgeted cost to support the system has been between $7-8M/annually
- Based on a 2010 Gartner study, organizations annually spend 10-30% of their implementation cost for system maintenance and enhancements
  - **Based on this model, the City would be spending $2.7 - $8.1M annually, so is within industry range**

How have we supported the system?

Full In-House Service Team Accomplishments:

▸ Implemented two annual technical upgrades for SAP to allow for increased functionality and vendor support

▸ Implemented Payment Card Industry–compliant solution for on-line payments

▸ Implemented contract renewals/changes such as bank depository and external delinquent collections

▸ Implemented postal standards for addresses to reduce returned mail

▸ Developed and implemented solutions for hundreds of small business-driven enhancements and incidents

How have we supported the system?

Full In-House Service Team Accomplishments:

▸ Planned and executed Year-End activities (three fiscal years) for rate, fee changes and required reporting

▸ Implemented DWU's Contamination Warning System – Consumer Surveillance Complaints

▸ Upgraded bill print software to maintain vendor support

▸ Completed the testing associated with the new Interactive Voice Response transition

▸ Updated departmental liens and loans functionality

▸ Currently addressing short and long term hardware purchase, maintenance and support

How have we supported the system?

Full In-House Service Team Challenges:

▸ Recruiting and retaining the right IT resources with skill sets in SAP has proven very difficult for the City:

  ◦ Increased competition for SAP-skilled resources

  ◦ Changing CIS staffing due to retirements and resignations

  ◦ Out of 53 employees assigned to work on the system since 2007, 44 have left

  ◦ Average tenure of City's SAP/IT employee – 2.0 Years

  ◦ Lack of salary competitiveness

▸ No established Service Level Agreements (SLAs) for SAP service support between CIS and DWU

▸ With these challenges, CIS and DWU decided during 2nd Q of 2011 to explore alternative support strategies through an RFCSP for outsourced managed services/hosted infrastructure

<u>Cost Summary (in millions):</u>

Project Implementation	$27.7
Support and Enhancements (3 years)	$25.5
TOTAL	$53.2

Notes: Both implementation and ongoing support/enhancements have been within industry benchmarks

<u>Overview</u>

▸ The Full In-House service team spent approximately 3 years trying to evolve to a CIS Department self-sufficient model
  ◦ HCL-Axon contract term expiring

▸ In light of the ongoing staffing challenges, CIS and DWU began during 2nd quarter 2011:
  ◦ Exploring alternative support strategies
  ◦ Developing the RFCSP for Outsourced Managed Services/Hosted Infrastructure model
  ◦ Negotiating contract extension with HCL-Axon

▸ FY11-12 Budget assumed:
  ◦ Council approval of contract extension not to exceed 20 months
  ◦ Continuation of uninterrupted SAP system support by CIS/HCL-Axon support
  ◦ Development of RFCSP

Where are we going and what are future plans?

- CIS will advertise RFCSP 1st quarter 2012 for support services partner for City's SAP system to include:
  - ◦ Day to day technical support
  - ◦ System maintenance
  - ◦ Application support for enhancements and new projects

- This arrangement should enhance accountability and provide increased efficiencies for IT and business units.

- Target date of June 2012 to bring Agenda Item to Council for Managed Service/Hosted Infrastructure provider

- **Since CIS has a high number of positions vacancies, this approach for managed services does not contemplate any layoffs.**

Where are we going and what are future plans?

Managed Services/Hosted Infrastructure RFCSP Tentative Schedule

Document Business / Technical Requirements	1st Q 2012
RFCSP Advertising:	1st Q 2012
Proposal Due:	2nd Q 2012
Vendor Presentations:	2nd Q 2012
Final Selection:	2nd Q 2012
Contract Negotiations:	2nd Q 2012
Brief BFA Committee:	2nd Q 2012
Tentative Council Agenda Date:	2nd Q 2012
New Vendor Transitioned By:	2nd Q 2013
Brief progress on Managed Services:	4th Q 2013

Where are we going and what are future plans?

Seeking Committee Support

▸ **12/14/11** - Council was presented with an Agenda item for the HCL-Axon contract extension
   ◦ Council approved 5th Supplemental Agreement for 3 month extension (12/1/11 - 2/29/12) to allow adequate briefing on Project and SAP system support history

▸ Finalize 6th Supplemental Agreement to retain HCL-Axon resources
   ◦ Seek support of 17 month contract in an amount not to exceed $7.4M to allow sufficient time to complete the managed services/hosted infrastructure contract effort
   ◦ $5.1M for on-going support and to complete FY11-12 projects
   ◦ $2.3M for potential new projects, subject to hardware refresh
   ◦ Contract terms allow for early termination with 30 day notice

▸ Alternate service and staffing model
   ◦ CIS and DWU are currently addressing alternative support that may be more sustainable and cost efficient
   ◦ New strategy will encompass a more mature service delivery model and provide for reliable SLAs and improved service quality
   ◦ Managed services approach seeks a blending of City staff/vendor expertise

What lessons have we learned?

o Continue regular updates to Council on significant strategy changes, e.g. the SAP service model

o Recognize that setting up a support organization, governance model, and service processes for SAP is different than for a traditional single purpose system

o Have business/IT service level agreements from the start to mutually understand:
  o expectations about service delivery
  o performance measurement
  o problem /change management and customer roles

o "Forecast the weather" (staffing resources) more accurately
  o Recognize and plan for the impact of skill-set competition in the technology industry

o In hindsight, recognize the need to change sooner

Questions?

Appendices

Appendices

A. Debunking "Urban Myths":
   1. DWU double billed customers.
   2. Online bill payment doesn't work.
   3. If a customer has multiple water accounts at various locations, bills should be consolidated into one envelope.
   4. All City fees should be consolidated and printed on the utility bill.

B. SAP Project Implementation Costs

C. SAP Support Costs

D. Assessment/Service Model

E. Sampling of SAP Customers

F. Sampling of City's Systems by Support Service Models

Appendix A - Debunking "Urban Myths" 1: DWU double billed customers.

The Facts:

▸ On 3/21/08 and 3/26/08, DWU mailed 26,000 bills twice, out of more than 300,000 bills created/mailed in March 2008.

▸ No account was double billed or charged twice.

▸ City Council instructed DWU to issue apology letters to all affected customers.

▸ Approximate cost:
    $9,409 for duplicate invoice postage
  + $9,409 for follow up apology letter postage
  + $1,820 for paper, printing, and insertion
   $20,638 (not including administrative time)

▸ For perspective, DWU produced 3.35M invoices in FY 08-09. This error, just 6 weeks after system implementation, represented <0.7 % of total bills produced.

Appendix A - Debunking "Urban Myths" 2: Online bill payment doesn't work.

The Facts:

▸ Implemented simple, "plain vanilla" online bill review and payment system
  ◦ Little customization
  ◦ Epay.dallascityhall.com is **NOT** Amazon.com

▸ Online bill payment most certainly works!

▸ Increasing popularity of becoming "paperless"
  ◦ FY 08-09   22,330 customers/month (approximately 8% of paper bills)
  ◦ **FY 10-11   35,159 customers/month (approximately 10% of paper bills)**

▸ Increasing revenues collected from online payments
  ◦ FY 08-09   10.5% of total utility revenues
  ◦ **FY 10-11   15.2% of total utility revenues**

▸ 311/Water Customer Service reviews/responds to about 350 questions and service requests/month sent by customers through online system

▸ DWU sends letters to customers with returned notices, inviting them to update their email address

Appendix A - Debunking "Urban Myths" 3: If a customer has multiple water accounts at various locations throughout the City, bills should be consolidated into 1 envelope?

The Facts:

▸ Every month DWU reads >300K water meters, routed for optimum productivity across the City's service territory into 21 portions.

▸ Approximately 1 portion (comprised of about 12-15K meter readings) is billed every business day.

▸ Until the City installs automated meter reading for every water meter and can therefore theoretically read any meter every day, consolidating portions in one envelope is not possible.

▸ Currently, the customers in this situation have the option to "go green" by becoming "paperless" and paying their utility invoices online at epay.dallascityhall.com to:
  ◦ Conserve paper, envelopes, and postage
  ◦ Reduce # or separate payments

Appendix A - Debunking "Urban Myths" 4: All City fees should be consolidated and printed on the utility bill?

<u>The Facts:</u>

▸ State law prohibits adding other non-utility charges to the utility bill

▸ Currently it is not possible to consolidate disparate charges into one single bill because of:

- Disparate ordinance terms and conditions
- Required due process (for example, collections)
- State laws impacting the City's fees and fines

▸ 900+ fees and charges have been consolidated into one billing system
- There are opportunities to include other City receivable types in SAP as those systems are eligible for replacement or 3rd party contracts expire

▸ A business case and functional requirements will need to be developed and evaluated to create consolidated quarterly or annual delinquent bill to citizens/customers

Appendix B - SAP Project Implementation Costs

Date	Vendor	$ in millions
1/12/2005	Jericho Consulting, Inc.	$1.5
10/25/2006	Axon Consulting, Inc.	$11.7
10/25/2006	SAP Public Services, Inc.	$2.1
10/25/2006	Jericho Consulting, Inc.	$1.7
6/27/2007	Axon Consulting, Inc.	$0.1
8/8/2007	Informatics Holdings, Inc. (System ID Warehouse)	$0.1
8/8/2007	Mythics, Inc.	$1.7
2/27/2008	Axon Consulting, Inc.	$1.7
2/27/2008	Jericho Consulting, Inc.	$0.9
2/27/2008	Hewlett Packard/Exstream	$0.58
11/10/2008	Axon Consulting, Inc.	$0.47
Project duration	CIS Contract Resources	$5.2
	Subtotal	$27.7

Appendix C – SAP Support Costs

SAP Support Cost for CIS thru 9/30/11			$ in millions
FY 08-09	CIS Staff/Support		$3.9
FY 09-10	CIS Staff/Support		$3.6
FY 10-11	CIS Staff/Support		$3.6
		SubTotal	**$11.1**
SAP Support Cost for HCL-Axon through 11/30/11			
11/10/2008	Advantaged Solutions, Inc.		$9.6
4/14/2010	Advantaged Solutions, Inc. - SA #1		$0.0
6/23/2010	Advantaged Solutions, Inc. - SA #2		$3.2
8/31/2011	Advantaged Solutions, Inc. - SA #3		$0.0
10/28/2011	Advantaged Solutions, Inc. - SA #4		$0.0
		SubTotal	**$12.8**
		Total Support Costs	**$23.9**
FY 09 thru FY11	**CIS Hosting**		**$1.6**
		GRAND TOTAL SUPPORT	**$25.5**

Appendix D – Assessment/Service Model

- Included in the implementation, AXON reviewed the City's "readiness" for creating and supporting a service model for SAP
  - 27 standard service functions
  - 11 service processes
  - Common good practices when operating and supporting SAP

- Production Support Readiness Assessment included:
  - Immediate Goal
    - Support the Production system for the City's SAP Customer Care and Service (CCS) Utilities implementation
  - Mid-term Goal
    - Balance the SAP stabilization and production support needs with the City's Phase 2 SAP project which expanded the initial SAP range of business applications
  - Long-term Goal
    - Establish and sustain a support structure and complementary Service Model that focused on best SAP support delivery practices
    - Promote ongoing benefits and measurable business value through the use of SAP

Appendix E - Sampling of SAP Customers

USA

- 3Com Corporation
- Bechtel Corporation
- Bose
- Clorox Company
- Eli Lilly and Company
- General Motors
- Harley Davidson Hershey Food Corporation
- L-3 Communications
- Microsoft
- McKesson Corporation
- Nestle USA
- Price Waterhouse Coopers
- Shell Oil Company
- Time Warner, Inc.
- Walt Disney Company

Public Sector

- City of Palo Alto
- City of Phoenix
- City of Tacoma
- City of Los Angeles
- County of Sacramento
- County of Santa Clara
- State of Arkansas
- State of Florida
- State of Louisiana
- St. Louis Public Schools
- Erie County, New York

Regional - DFW

- 7 Eleven
- American Airlines
- Cadbury Schweppes
- Celanese
- Fossil
- Exxon Mobil Corporation
- Pilgrims Pride
- Tarrant County
- Texas Instruments
- Safety- Kleen Systems Inc
- Sabre
- EDS

Utilities

- TXU
- San Antonio Water System
- Pacific Gas & Electric
- Oklahoma Gas & Electric
- Arizona Electric Power Cooperative
- Wisconsin Electric
- New York Power Authority
- National Grid

Appendix F - Sampling of City's Systems by Support Service Models

Basic In-House

- Lawson HRIS 2009
- CGI/AMS Financial System
- TriTech Computer Aided Dispatch
- Citizen Request Management System (CRMS)
- DWU Advanced Metering Infrastructure system (AMI)
- Records Management System – DPD and DFR
- WasteWorks information management system for landfills, recycling centers, material recovery, etc.

Full In-House

- Municipal Courts System
- DPD Offense Reporting System
- Council Agenda Preparation System (CAPS)
- Pavement Management / Street Condition Inventory System
- Digital Crime Scene System
- Lobbyist Registration System
- Campaign Finance System

Outsourced Managed/ Hosted Infrastructure

- Lawson HRIS in 2001 to 2009
- Citywide Telephone and Data Network
- Employment Application Tracking System (NeoGov)
- Reverse 9-1-1
- Aviation Parking Revenue Control System (PRCS)
- Capital Projects Management System (CAPPro)
- Streets Snow/Ice Response