CITY OF PALO ALTO OFFICE OF THE CITY AUDITOR

The Honorable City Council
Palo Alto, California

Policy and Services Recommends the City Council Accept the ERP Planning: Data Standardization Audit

The Office of the City Auditor recommends acceptance of the ERP Planning: Data Standardization Audit. At its meeting on October 23, 2018, the Policy and Services Committee approved and unanimously recommended that the City Council accept the report. Additionally, the Policy and Services Committee recommended a broader discussion with the City Council of this audit, ERP Planning: Separation of Duties Audit, and the ERP Planning: Information Technology Data Governance Audit. In response to that request, on April 1, 2019, the Information Technology Department provided a review of the ERP system status in an informational report to City Council (Staff Report ID # 9826).

The City Auditor's report to the Policy and Services Committee and the transcript minutes are available on the City's Policy and Services Committee website.

Respectfully submitted,

Don Rhoads, CPA
Special Advisor to the Office of the City Auditor
Management Partners

ATTACHMENTS:

- Attachment A: Data Standardization Audit   (PDF)

Department Head: Don Rhoads, Special Advisor to the Office of the City Auditor

ERP Planning: Data Standardization
October 17, 2018

Office of the City Auditor

Harriet Richardson, City Auditor
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OFFICE OF THE CITY AUDITOR
EXECUTIVE SUMMARY
ERP Planning: Data Standardization
October 17, 2018

PURPOSE OF THE AUDIT

The purpose of this audit was to determine if the City currently has data standardization in place in ERP master data and to give examples for types of standardization recommended prior to transferring data to the new ERP system.

REPORT HIGHLIGHTS

Finding:

Implementing data standardization will increase data accuracy and uniformity in the future ERP system.

The City can benefit from formalizing data standardization. Within the City's current ERP system, SAP, we identified examples for improving data quality, compatibility, and consistency. Implementing data standardization will offer a structure for facilitating the input of data in a more accurate and uniform manner. It will also improve data output and data analytics.

The five main benefits of data standardization:
- Improved data quality
- Increased data compatibility
- Improved consistency and efficiency of data collection
- Reduced data redundancy
- Improved data access.

Key Recommendations:

The City should review city data and implement data cleansing through manual or automated methods for data standardization prior to transfer to the new ERP system. The Information Technology Department should:

- Provide governance over data standardization, such as who is responsible for data standardization, what data is subject to standardization, what is the data standardization, when does standardization change, etc.
- Work with Departments to review the data within SAP and determine what will benefit most by standardizing data.
- Review other systems and implement data standardization, where feasible and beneficial; especially in circumstances when the data feeds into SAP.
- Require Departments to implement data standardization requirements during data cleansing in the ERP transition.

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ABBREVIATIONS

DAMA	Data Management Association
DMBOK	Data Management Body of Knowledge
EPA	Environmental Protection Agency

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INTRODUCTION

Objective

The purpose of this audit was to determine if the city has data procedures that govern standardization of master data in SAP and to give examples for types of standardization that would be beneficial when implementing the new ERP system.

Background

In the ERP Planning: Data and System Security Governance audit, we identified areas of concern for the lack of data governance in the City. The audit states that successful business processes require accurate, consistent, and complete master data.

Master data

Master data is the source for the most accurate data on business practices within the City and is used to inform transactional data. It pertains to business entity information regarding employees, customers, vendors, and the organization. Management provides control over how master data is entered in a system to enable consistent, shared, and contextual use across systems.

Data Standardization

Data standardization is the model, examples, or rules to increase reliability and effectiveness of common data elements. The two main components to data standardization are implementing policies and automated processes to reduce errors as data is being entered in the database and making corrections to data in the database.

Policies and procedures should define an organization's data standards, including controlling input structures within the database, such as format, naming conventions, standard abbreviations, and allowable ranges of master data values; organizational policies, such as data cleansing standards and procedures; or greater data governance structures. Once data is entered into the database, automatic or manual tools can be used to standardize data.

Data quality rules for master data should include elements of both strategies. It is considered a best practice to control data entry on the front end through policies and procedures rather than relying primarily on downstream data cleansing tools.

City's Commitment to Accurate Data

The City instituted an open data web portal in 2012 to offer residents and interested parties access to city data and proclaimed in 2014 that it would institute "open data by default" to make city

functions more "transparent, participatory, and accountable."

Adopting a new ERP system is a moment of opportunity for the City to ensure the reliability and transparency of city data and to allow for greater investment in data in the future.

Past Audits

The City Auditor's Office has encountered data standardization and data integrity issues in several past audits, including:

- 2017 Continuous Monitoring Audit: Payments
- 2017 Accuracy of Water Meter Billing Audit
- 2015 Utility Meter Audit: Procurement, Inventory, and Retirement
- 2013 Employee Health Benefits Administration Audit

Scope

This audit gives guidance on data standardization policies and consistency issues that should be addressed through data cleansing prior to transferring data to the new ERP system. It provides general examples of non-standardized data as currently entered in SAP to provide context for the type of data standardization concerns. Companion audits will explore the accuracy and completeness of specific city data sets and give recommendations to specific departments for improving the reliability and integrity of those data sets.

It was beyond the scope of this audit to look at standardization of data from sources other than SAP that may filter into the Open Data platform. However, instituting organization-wide data standardization and governance policies will allow for more accurate outfacing data to the public through the Open Data platform, which will increase the reliability and transparency of data for city residents.

Methodology

To accomplish our objective, we:

- Identified standardization issues in city master data sets in SAP, which is the City's current enterprise resource planning system.
- Identified any existing data policies in place (data dictionaries, data input rules in SAP).
- Analyzed a sample of data sets for inconsistency and data standardization issues.
- Displayed these examples based on the potential benefits that

would come from standardizing the data.

- Provided examples on how to improve data input processes and data cleansing for more standardized data.

- Used the Environmental Protection Agency's (EPA) data standards, developed in partnership with the Environmental Data Standards Council for information collection and exchange, to identify potential benefits for data standardization.[1]

- Referenced and used as guidance the Data Management Body of Knowledge (DMBOK), published in 2010 by the Data Management Association (DAMA). We used this guidance to define data standardization and to outline practices for evaluating the extent to which the City's data is standardized.

We selected data that was entered into SAP from January 1, 2016 through April 13, 2018. We chose this date range to concentrate examples on recent rather than historical data while still having a large enough range to demonstrate patterns in the data. The examples we used represent typical issues in SAP that could benefit from standardization, rather than specific high-risk areas. These types of issues occur throughout SAP, as evidenced by the number of past audits that have identified data standardization and integrity issues. As such, no specific department or area is intended to be singled out. Rather, the audit discusses the greater issue with data standardization across City master data.

Compliance with government auditing standards

We conducted this audit of ERP Planning: Data Standardization in accordance with our FY 2018 Annual Audit Work Plan and generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We would like to thank management and staff in the Administrative Services Department and the Information Technology Department for their time, cooperation, and assistance during the audit process.

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[1] "Data Standards Briefing Paper," Environmental Protection Agency, available at
https://www3.epa.gov/ttnchie1/conference/ei12/panel/kohn.pdf

Finding

Implementing data standardization will ensure increased data accuracy and uniformity in the future ERP system.

Summary

The City can benefit from formalizing data standardization. Within the City's current ERP system, SAP, we identified examples for improving data quality, compatibility, and consistency based on our assessment of data in different working areas. Implementing data standardization will offer a structure for facilitating the input of data in a more accurate and uniform manner. It will also improve data output and data analytics.

Benefits of Data Standardization

The EPA Data Standards Briefing Paper explains five main benefits of data standardization:

- Improved data quality
- Increased data compatibility
- Improved consistency and efficiency of data collection
- Reduced data redundancy
- Improved data access.

The sections below give examples of the City's SAP master data that is not standardized and explain benefits that would potentially be gained by standardizing data.

Improved Data Quality

Improving data quality would ensure that a common language is established for data entered in SAP, which can facilitate an easier and more accurate exchange of information. Exhibit 1 shows examples of data quality issues in one type of SAP master data.

Exhibit 1: Inventory Master – Inconsistencies in Data Table

Material	Unit	Mfr Part Number	Material description
094102	EA		LAMP INCAND 150A IF 130V
094103	EA		LAMP INCAND 150A23 130V
094330	EA		LAMP INCAND 189-PS-25/64 120V
094331	EA		LAMP INCAND 295-PS-35/58 120V
094110	EA		LAMP INCAND 300M/IF 130V
094122	EA		LAMP INCAND 50ER30 130V
094100	EA		LAMP INCAND 60A IF 130V
094120	EA		LAMP INCAND 75A IF 130V
094101	EA		LAMP INCAND. 100W, MED. BASE
094105	EA		LAMP INCAND. 200W, MED. BASE
094126	EA		LAMP INCAND. 75ER30 130V
094220	EA		LAMP FLORESENT F96T12/LW/HO/EW
094200	EA		LAMP FLOURESCENT, F32T8TL741ALTO
094210	EA		LAMP FLUORESCENT F96T12/CW/SS
094121	EA		LAMP HALOGEN 45W, PAR38 FLOOD
094125	EA		LAMP HALOGEN 90W, PAR38 FLOOD
094301	EA		LAMP MV 175 WATT H39KC-175/DX

Exhibit 1 shows that the material description does not have a consistent structure. Although all of the items include similar information for lamps, there are discrepancies in the item details, which could cause ordering errors if the description does not include all needed information or potentially result in mistakes when ordering parts and/or reordering items. For example, there are:

- inconsistencies on what is included as lamp specifications (watts, voltage, or both)
- inconsistencies in the technical description (e.g., inclusion/exclusion of the base size)
- inconsistencies in the use of "W," "Watts," or neither to denote wattage
- inconsistencies in the use of commas and/or periods to separate the item type from its description
- spelling errors

In addition, some columns are not consistently filled out, such as the manufacturer part number that is often left blank. Omitting key information in the master data could cause ordering issues for items that require, for example, a specific manufacturer or energy rating to comply with city policy.

Although the description field has some structure to the input, creating standardization rules would be more useful both for those familiar and unfamiliar with any specific item:

- Having a consistent format would makes it easier to find a specific item and help ensure that the correct item is purchased.
- Including all key information in appropriate field would allow searches on other details, such as the manufacturer part number, rather than relying only on information entered into the material description field.
- Exhibit 2 shows how stricter standardization rules would assist in the consistency of the light bulb data for the Material Description field.

Exhibit 2: Inventory Master – Current vs. Improved Description Example

The current data entry rule: ITEM and TYPE and other information	An example standardization rule of: ITEM, TYPE, WATTAGE AND SHAPE, BASE SIZE
Original Material Description	Example Standardized Material Description
LAMP INCAND 150A IF 130V	LAMP, INCAND, 150W A23, E26
LAMP INCAND 150A23 130V	LAMP, INCAND, 150W A23, E26
LAMP INCAND 189-PS-25/64 120V	LAMP, INCAND, 189W PS25, E26
LAMP INCAND 295-PS-35/58 120V	LAMP, INCAND, 300W PS35, E39
LAMP INCAND 300M/IF 130V	LAMP, INCAND, 300W PS30, E39
LAMP INCAND 50ER30 130V	LAMP, INCAND, 50W ER30, E26
LAMP INCAND 60A IF 130V	LAMP, INCAND, 60W A19, E26
LAMP INCAND 75A IF 130V	LAMP, INCAND, 75W A19, E26
LAMP INCAND. 100W, MED. BASE	LAMP, INCAND, 100W ER30, E26
LAMP INCAND. 200W, MED. BASE	LAMP, INCAND, 200W ER30, E26
LAMP INCAND. 75ER30 130V	LAMP, INCAND, 75W ER30 REFLECTOR, E26
LAMP FLORESENT F96T12/LW/HO/EW	LAMP, HO FLUORESCENT, 95W F96T12, SINGLE PIN
LAMP FLOURESCENT, F32T8TL741ALTO	LAMP, FLUORESCENT, 32W F32T8, BIPIN
LAMP FLUORESCENT F96T12/CW/SS	LAMP, FLUORESCENT, 60W F96T12, SINGLE PIN
LAMP HALOGEN 45W, PAR38 FLOOD	LAMP, HALOGEN, 45W PAR38 FLOOD, E26
LAMP HALOGEN 90W, PAR38 FLOOD	LAMP, HALOGEN, 90W PAR38 FLOOD, E26
LAMP MV 175 WATT H39KC-175/DX	LAMP, MV, 175W ED28, E26

These two changes, standardizing in data the material description column and including manufacturer part numbers in the manufacturer part number column, are examples of how to increase the overall quality of the dataset. Information in these columns could better direct inventory and purchasing staff regarding what to buy.

Increased data compatibility

Data standardization can improve the compatibility of data across modules in SAP. This can be accomplished by establishing data dictionaries or building policies in the system to require that all data in having the same field names contain identical data throughout the system. This can be accomplished by requiring a single point of entry for any particular data field. Data that is inconsistently entered across the system can create errors that could lead to financial and business losses, as well as an inability to provide accurate reporting for decision-making purposes. It can also create a need for additional data cleansing if data used as the primary field for migration into the new ERP system is selected from an incorrect data source. It may not be possible to combine data from nonmatching fields, but if done, can lead to general incompatibility, redundancy, or other errors.

Two examples of data incompatibility are shown in Exhibit 3. First, there are two fields in SAP that identify a Division, which specifies a type of service provided (i.e., electric, gas, water, etc.). One field is Division and the other is Division Category, both representing the service type; however, they are inconsistent with each other. Second, the two fields Account Determination (AD) and Type of Premise specify the type of property serviced (i.e., residential, commercial, industrial, etc.). Although both fields may be used slightly differently, the numbering, sequencing, naming, and detailed breakdown would likely benefit from standardization. These two examples show nonmatching and incompatible data that should be reviewed for structural inconsistency in the new ERP system.

Exhibit 3: Utility Service and Property Type Inconsistency and Incompatibility Examples

- The division type (under Dv and Division category) and description (under Name and Short Description) do not contain the same dropdown list/choices.
- The naming, Electric and Electricity, are inconsistent.
- The naming and use of Division number 06 are different from each other.
- There are gaps in the numbering within each.

- The property type categories, Account determination and Type of premise, do not contain the same dropdown choices.
- The naming descriptions and detail of description are inconsistent.
- The numbering and sequencing are incompatible.

Improved consistency and efficiency of data collection

As stated in the data governance audit, the City does not currently have data standardization policies. These policies can improve the consistency of data by outlining the information that should be included within a field and requiring a consistent format. Some policies can be built into an ERP system through drop-down menus that limit input to standardized choices and requiring that open-text inputs be in a certain format. Doing this provides the additional benefit of increasing efficiency by reducing the amount of typing needed for data collection.

Examples of inconsistency issues that can be controlled by data standardization policies include:

- Formatting (0.11 vs. 0.1, (XXX) XXX-XXXX vs. XXXXXXXXXX vs. XXX.XXX.XXXX)
- Inputs (Street vs. St. vs. st)
- Type (12 vs. twelve)

In addition to formatting consistency, standardization policies can require input of fields that are deemed important to be included in the database, thereby reducing the number of blank or missing fields. This type of policy can also be built into an ERP system by not allowing the person entering the data to move on to the next screen or action unless certain data has been entered.

City data currently has both omissions and inconsistent formatting, which demonstrate the effect of not having strong data standardization policies. Exhibit 4 shows an example of City vendor data that has inconsistent formatting of the vendor name, city name, postal code, and address. Additionally, although there is a field for a PO Box, it was not used in in the time period reviewed in favor of being included in the street field. This could possibly cause issues with mailings or contacting the vendor.

Exhibit 4: Vendor Master - Formatting Inconsistencies

Name 1	City	PO Box	PostalCode	Rg	SearchTerm	Street
KRONICK, MOSKOVITZ, TIEDEMANN & GIR	SACRAMENTO		95814	CA	KRONICK, M	400 CAPITOL MALL, 27TH FLOOR
VALHALLA BUILDERS, INC.	SAN JOSE		95119	CA	VALHALLA B	6985 VIA DEL ORO, SUITE A5
ADVANCED INFRASTRUCTURE TECH, LLC	TORRANCE		90505	CA	ADVANCED I	3055 KASHIWA STREET
CSC INTEGRATION, LLC	Sunnyvale		94085	CA	CSC INTEGR	830 STEWART DR., STE. 218
BEAR ELECTRICAL SOLUTIONS, INC.	ALVISO		95002	CA	BEAR ELECT	1341 ARCHER ST., P O BOX 924
TRIP STOP SIDEWALK REPAIR INC.	SAN MATEO		94401	CA	TRIP STOP	1424 EAST 3RD AVE
SILVERADO AVIONICS, INC.	NAPA		94558	CA	SILVERADO	2500 AIRPORT ROAD
REGIONAL GOVERNMENT SERVICES AUTHOR	CARMEL VALLEY		93924	CA	REGIONAL G	P O BOX 1350
MARCIVE, INC.	SAN ANTONIO		78265-7508	TX	MARCIVE, I	P O BOX 47508
HELLOFUTURE LLC.	SAN JOSE		95124	CA	HELLOFUTUR	1639 SWANGATE WAY
HEART RATE INC.	SANTA ANA		92705	CA	HEART RATE	1411 E. WILSHIRE AVE.
AVIATION MANAGEMENT CONSULTING GROU	CENTENNIAL		80112	CO	AVIATION M	9085 E. MINERAL CIRCLE, STE. 315
FASTSIGNS	ELK GROVE		95624	CA	FASTSIGNS	9117 EAST STOCKTON BLVD., 140
COMMERCIAL CASEWORK, INC.	FREMONT		94538	CA	COMMERCIAL	41780 CHRISTY STREET
FORSYS INC.	FREMONT		94538	CA	FORSYS INC	6036 STEVENSON BLVD.
OLIVINE, INC.	SAN RAMON		94583	CA	OLIVINE, I	2010 CROW CANYON PLACE, STE. 100
ALTEC CAPITAL SERVICES, LLC	BIRMINGHAM		35242	AL	ALTEC CAPI	33 INVERNESS CENTER PKWY., STE. 200
SHUMS CODA ASSOCIATES, INC.	PLEASANTON		94588	CA	SHUMS CODA	5776 STONERIDGE MALL RD., #150
BELLINGHAM MARINE INDUSTRIES, INC.	BELLINGHAM		98229	CA	BELLINGHAM	1323 LINCOLN STREET

Implementing a data standardization policy either within the ERP system or through a data governance policy requires input of fields that are deemed important for consistency.

Reduced data redundancy

Data redundancy can be reduced through data standardization. Reducing data redundancy makes it easier to locate existing records rather than creating new records for the same data.

We observed redundancy of data in master vendor files. For example, Exhibit 5 shows that the same vendor name was associated with several vendor numbers rather than only one vendor number being associated with each unique vendor. The only difference between the vendor files is the formatting of the street address. Redundancy in this case could cause issues with the history of purchases from the vendor and cause other data issues.

Exhibit 5: Vendor Master - Name and Search Term

Name 1	City	Post.Code	Rg	Search term	Street
EAN HOLDINGS LLC	TULSA	74117	OK	EAN HOLDIN	6929 NORTH LAKEWOOD AVE #100
EAN HOLDINGS LLC	TULSA	74117	OK	EAN HOLDIN	6929 N LAKEWOOD AVE #100
EAN HOLDINGS LLC	TULSA	74134	OK	EAN HOLDIN	14002 E 21ST STREET STE 1500
EAN HOLDINGS LLC	TULSA	74134	OK	EAN HOLDIN	14002 EAST 21ST ST STE 1500

Exhibit 6 shows that there are two records for what are likely identical items. They have different material numbers due to inconsistency in inputting information. Adding to the issue, the material part number was not entered, which could make it difficult to find the right item when ordering (see above discussion regarding improved data quality). Not having consistent rules for entering data can lead to multiple records for the same items.

Redundancy in this example could lead to purchasing and purchase history errors.

Exhibit 6: Inventory Master – Material Description

Material	Unit	Mfr Part Number	Material Description	Material description
094102	EA		Lamp Incand 150A IF 130V	LAMP INCAND 150A IF 130V
094103	EA		Lamp Incand 150A23 130V	LAMP INCAND 150A23 130V

These two examples demonstrate how redundant data may be a result of formatting inconsistency and result in search errors. Standardizing the structure of data inputted into the ERP system would help minimize redundancy.

Improved data access

Standardized data can improve data access by making it easier to retrieve information. For example, it can be difficult to retrieve complete and accurate information if search terms are not standardized. Exhibit 7 shows an example shows that the search terms have several standardization issues:

- Search term does not match name of vendor

- One search term for multiple vendors

- First and/or last name used for search term inconsistently

These inconsistencies could lead to issues of data access.

Exhibit 7: Vendor Master Search Terms

Name 1	SearchTerm
HEART RATE INC	VERSA CLIM
PROFESSIONAL ACCOUNT MANAGEMENT, LL	DUNCAN SOL
TRI-VALLEY POLYGRAPH	STACY ROBE
CHRISTOPHER HYDE	CHRISTOPHE
Christopher Jones	CHRISTOPHE
CHRISTOPHER ANTHONY	CHRISTOPHE
CHRISTOPHER DUNCAN	CHRISTOPHE
CHRISTOPHER ROTH	CHRISTOPHE
ALEXANDER SMITH	ALEX
JUAN DOMINGEZ	JUAN
LUIS ARTEAGA	LUIS
HOWIE ALCALA	ALCALA
GEREMY CHAN	CHAN
DAVE BAUER	BAUER

Other data feeding into the ERP system

The standardization examples we identified are applicable to data in other systems outside of SAP. It is important to also consider and apply standardizations to these data sets because the data may feed into the ERP system. Exhibit 8 shows an example of some of the same inconsistencies and redundancies in other systems. Palo Alto 311 and Accela are an external facing, multi-platform solution for providing Palo Alto residents, businesses, and visitors access to a set of local government-provided services and online requests. The Issue Types and the Case Types contain similarities but lists different descriptions. Standardization can assist with data quality, consistency, compatibility, redundancy, and access.

Exhibit 7: Other systems with data inconsistencies

PaloAlto311 Code Enforcement Issue Types:	Accela/Building Eye Case Types:
• Building Construction (Unpermitted) • Property Maintenance (Weeds, Vegetation, Encroachment, Junk/Debris in Public View, etc.) • Fences • Zoning Compliance (AirBnB, Vacation Rentals, Non-Conforming Use, etc.) • Signs (Non Permitted, Signs in Public Property, etc.) • Leaf Blower (Gas Powered) • Other	• Building • Encroachment • Fences • Home Occupation • Long Term Condition Monitoring • Property Maintenance • Short Term Rental • Signs (ARB) • Signs (Public Property) • Vehicles • Zoning • Leaf Blower

Recommendations

To help ensure that the City adopts best practices for data standardization when transitioning to the City's new ERP system, we recommend that the Information Technology Department adopt practices for standardizing data, specifically including:

1. Provide governance over data standardization, such as who is responsible for data standardization, what data is subject to standardization, what is the data standardization, when does standardization change, etc.
2. Work with Departments to review the data within SAP and determine what will benefit most by standardizing data.
3. Review other systems and implement data standardization, where feasible and beneficial; especially in circumstances when the data feeds into SAP.
4. Require Departments to implement data standardization requirements during data cleansing in the ERP transition.

APPENDIX 1 – City Manager's Response

The City Manager has agreed to take the following actions in response to the audit recommendations in this report. The City Manager will report progress on implementation six months after the Council accepts the audit report, and every six months thereafter until all recommendations have been implemented.

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	To be completed 6 months after Council acceptance and every 6 months thereafter until all recommendations are implemented	
			Current Status	Implementation Update and Expected Completion Date
Finding 1: Implementing data standardization will ensure increased data accuracy and uniformity in the future ERP system.				
To help ensure that the City adopts best practices for data standardization when transitioning to the City's new ERP system, we recommend that the Information Technology Department adopt practices for standardizing data, including:				
1. Provide governance over data standardization, such as who is responsible for data standardization, what data is subject to standardization, what is the data standardization, when does standardization change, etc.	Information Technology	Agree. Target Date: Dec 31, 2019 Corrective Action Plan: Data standardization and governance are both already priorities of the draft data strategy plan document that is being developed.		
2. Review other systems and implement data standardization, where feasible and beneficial; especially in circumstances when the data feeds into SAP.	Information Technology	Agree. Target Date: Dec 31, 2019 (For standardization guidance only. Remediation may take significantly longer and will be established once an assessment is made).		

Recommendation	Responsible Department(s)	Agree, Partially Agree, or Do Not Agree and Target Date and Corrective Action Plan	To be completed 6 months after Council acceptance and every 6 months thereafter until all recommendations are implemented	
			Current Status	Implementation Update and Expected Completion Date
		Corrective Action Plan: The plan to implement data standardization across systems beyond SAP will be covered in the City's upcoming data strategy plan.		
3. Work with Departments to review the data within SAP and determine what will benefit most by standardizing data.	Information Technology	Agree. Target Date: Dec 31, 2019. Corrective Action Plan: The plan to identify data and data stewards for SAP to determine standardization benefits will be covered in the City's upcoming data strategy plan.		
4. Require Departments to implement data standardization requirements during data cleansing in the ERP transition.	Information Technology	Agree. Target Date: Dec 31, 2019. Corrective Action Plan: This is already a mandatory component of the design phase of implementing the new ERP system.		