

# Enterprise Geographic Information Systems (GIS) Strategic Plan

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September 2016



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## Section 1 – Executive Summary

The City of Cupertino (City) has a robust GIS system. The City’s GIS Division which provides day to day maintenance of the system has put together an impressive system that provides good support and training to the GIS user base. With a focus on being progressive and providing better service, the City is interested in expanding the use and availability of the GIS system. As a result, the City embarked on creating a five-year strategic plan for the GIS that would help the City implement best in class GIS technology, further enhance business processes by using GIS, increase the visibility of GIS in the organization, and improve citizens access of public information using GIS. The goals for the strategic plan include:

- To enhance GIS service delivery with improved efficiency and effectiveness
- To expand GIS accessibility and use
- To achieve a greater level of integration of the GIS with the City’s business systems
- To better support City business processes
- To increase organizational awareness, visibility and department sponsorship for GIS
- To implement best in class GIS technology

The following is a five-year GIS Strategic Plan which acts as a roadmap for the City to realize the above goals.

The process began with a Needs Assessment that included gathering information via a questionnaire and on-site interviews with GIS stakeholders in the various City departments (See Appendix A for list of departments interviewed). The information gathered was analyzed and needs, gaps, and issues in key areas were identified. The key areas include:

- GIS Infrastructure
- GIS Data
- GIS Business Processes
- GIS Applications and Solutions
- GIS Training

The results of the Needs Assessment are summarized in Section 2. Appendix A includes information from on-site interviews that lays the foundation for Section 2. Based on the needs, gaps, and issues identified in the key areas above, a framework was developed that introduces several concepts for change. These are essentially the recommendations of the plan and are included in Section 3.

Section 4 includes the Implementation Plan which lays a five-year roadmap for the City to implement the recommendations from the plan and work towards achieving the identified goals. The Implementation Plan includes projects and trainings needed along with anticipated tasks and resources needed as well as estimated costs, where applicable. Timelines for each of the five years of the five-year plan are also included.

## Section 2 –Needs Assessment Findings

Information gathered using the surveys and on-site interviews uncovered several broad themes in the areas of GIS Infrastructure, GIS Data, GIS Business Processes GIS Applications, and GIS Training. These themes are summarized for each area below.

### GIS Infrastructure

The City's current GIS architecture is presented in Figure 1 below. There are essentially three computing environments – Development (on-premise)<sup>1</sup>, Production (on-premise) and Production (cloud). The on-premise development environment includes a server that hosts the test instance of Cityworks. The City uses this environment to test changes and upgrades to Cityworks software. The on-premise production environment includes the Enterprise SDE geodatabase that acts as the central repository of authoritative data and supports mapping workflows of internal GIS users. The production environment in the cloud is hosted in Amazon and includes the production instances of ArcGIS Server and Cityworks. This environment also includes a file geodatabase which is updated nightly with data from the on-premise production Enterprise SDE, via one-way replication. The production ArcGIS Server uses data sourced from this file geodatabase for map services that are consumed by the production instance of Cityworks as well as various public facing web applications. The cloud production environment in Amazon also includes a SQL Express database that is used by the production instance of Cityworks. The SQL Express database is replicated (two-way) nightly to the City's on-premise Enterprise SDE. The production instance of Cityworks uses feature services based on the SQL Express database to allow field crews to maintain workorder and inspection information.

The City's cloud based production environment also includes ArcGIS Online which is used to host public facing web maps, apps and services<sup>2</sup>.

The City has an Apache web server in the DMZ that is used to host public facing web applications. The overall architecture supports dissemination of GIS information to internal staff via client applications such as Magnet, MapGuide, ArcGIS Desktop, web maps and templated web apps in ArcGIS Online, and Collector for ArcGIS. The production cloud environment is used to serve secure apps and services to staff outside the firewall (e.g. field crews and Cityworks users), as well as public apps and services.

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<sup>1</sup> An additional development instance for testing ArcGIS Server is created in Amazon on an as-needed basis. This is not included in the architecture discussion.

<sup>2</sup> Although ArcGIS Online is a separate cloud solution provided by Esri, it is treated as part of the City's overall cloud based production environment in this discussion.



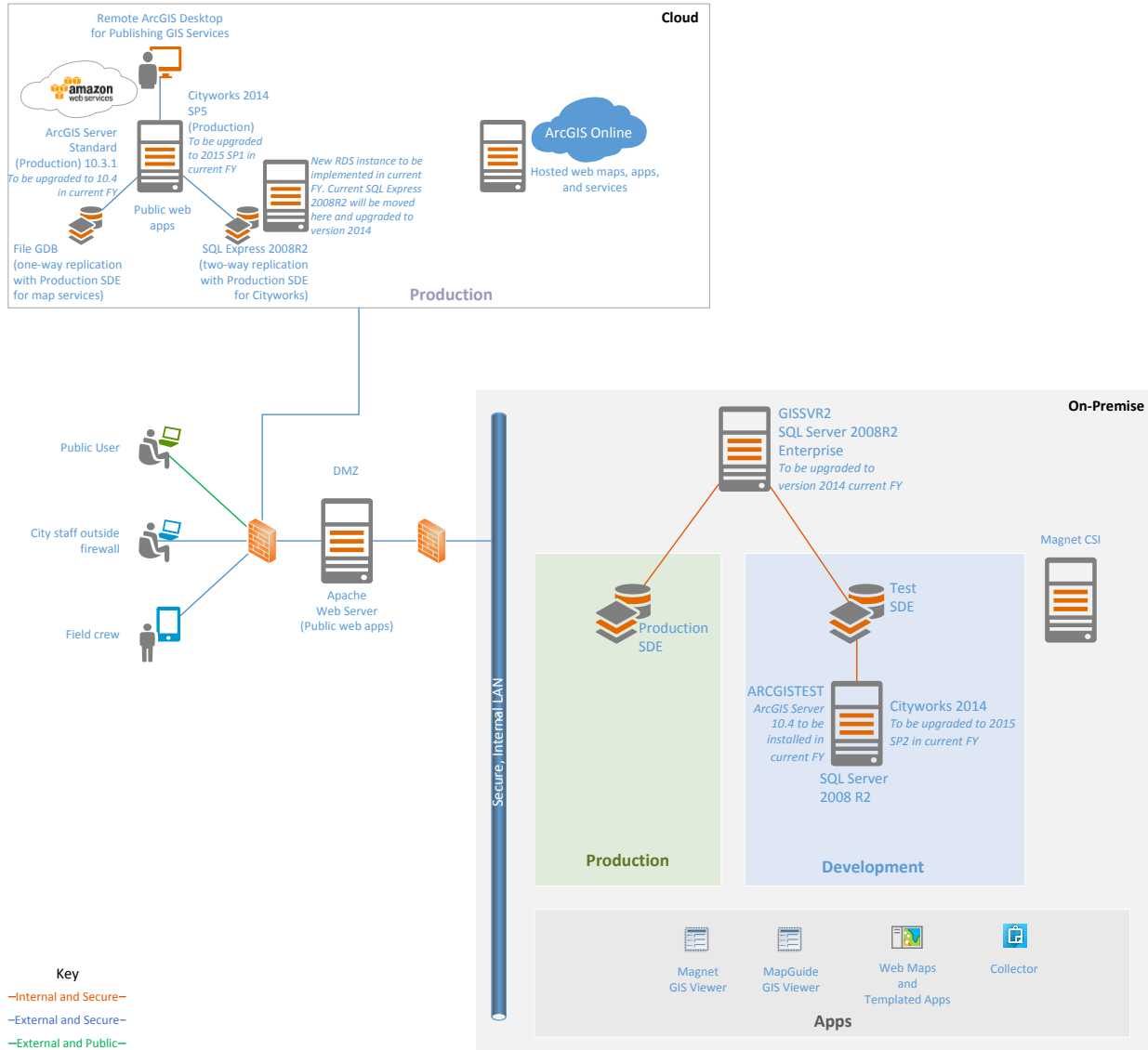


Figure 1: Current GIS Architecture

Based on a review of the current architecture, it can be said that the City has a well-established Enterprise GIS System that makes good use of many traditional architecture patterns such as a centralized Enterprise GIS database that stores authoritative data, GIS services that serve information via multiple clients including GIS desktop, web and mobile applications; isolated environments (development and production); integration with third party systems (permitting, asset management, etc.); and security. However, with the City’s stated goals such as implementing best in class GIS technology and enhanced GIS service delivery, the City will need to re-think their approach to leveraging the GIS, and expanding its role. Section 3 presents recommended ways for the City to organize their GIS for the future.

**Note:** As of the writing of this report, the City is in the process of upgrading some of the GIS architecture software components. These upgrades are noted in Figure 1. The City plans to upgrade Cityworks to

2015 SP1 in the development server in mid to late September 2016. The City plans to upgrade the SQL Server which hosts the SDE database to SQL Server 2014 in October 2016. The City also plans to upgrade the SQL Express database in Amazon to SQL Server 2014 by adding a Relational Database Service instance, around the same timeframe.

One of the primary bottlenecks in the GIS architecture is the lack of good cellular reception in the City. A significant infrastructure need for the City is to implement a solution that provides a reliable signal so that field crews can update data directly from the field. The City will be conducting a cell survey to estimate coverage and capacity and develop a strategy to improve signal reception that would help address this issue.

City staff who use GIS consider it to be highly valuable for their workflows. However, the availability of GIS remains limited to the groups that actively use it. The overall visibility of GIS in the organization can be improved.

The City has been making good use of existing infrastructure and has a good GIS architecture in place (See Figure 1). With rapid changes to technology in the GIS industry and how it is implemented, the City needs to look in to the future and consider expanding the architecture by implementing best in class GIS technology.

Section 3 introduces several concepts for change in the GIS infrastructure that address the above, for the City's consideration.

## GIS Data

The City has 147 layers in its Enterprise SDE. A large portion of these layers (76%) are used daily. Of the layers that are used daily, approximately 70% are up to date. Approximately 18 layers are present in the SDE that are used daily but are less than or 90% complete. The Needs Assessment revealed additional layers the City needs to create and update that users are requesting. A Data Inventory Matrix is provided on Page 22 with a listing of 43 layers that have been identified for updates as part of the Strategic Plan. Some of the layers do not currently exist.

ArcGIS Server service usage reports showed that the City is using the default number of pooled instances for all of its services. However, there are some high usage services such as aerial imagery, geometry service and storm data. The City will need to consider increasing the pooled instances for these services for better performance and availability. The City will also need to consider increasing the specifications of the Publication ArcGIS Server to support usage needs (e.g. allocating more cores, increasing RAM, etc.). The SDE has several unused layers. The City will need to review their need and future use.

Section 3 makes recommendations on adjusting the configuration of service instances (See Table 2).

## GIS Business Processes

The following chart shows the major themes of needs expressed by users as part of daily business processes. Each of these is further elaborated in this section.

**Note:** A higher number of mentions does not automatically indicate urgency or priority. The Implementation Plan (Section 4) takes in to consideration the overall situation to establish priority and not just number of mentions. These include but are not limited to, current efforts already underway to address needs mentioned, availability of budget, staff resources, training, and so on.

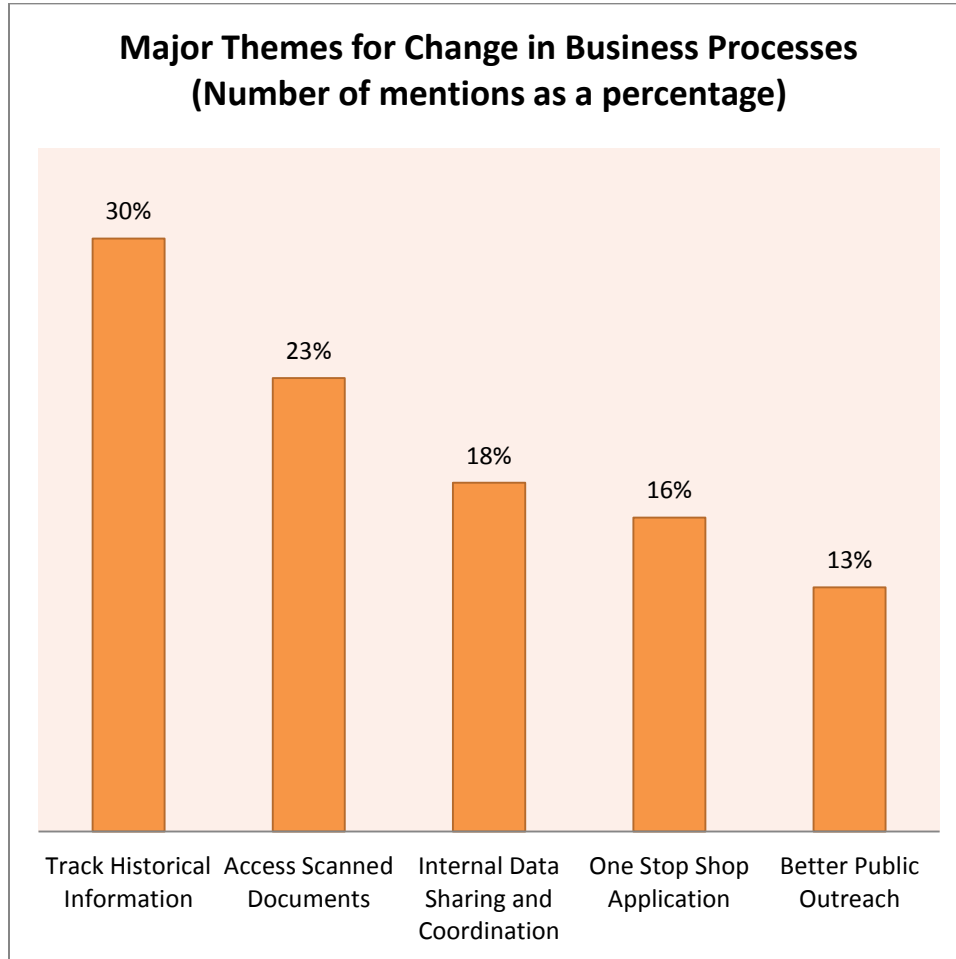


Figure 2: Major Themes for Change in Business Processes

### Track Historical Information

The City is interested in tracking and maintaining history of data generated during many of its business processes. The City would like to understand patterns and trends, and gain meaningful insights that might help in future planning of work and resource allocation. The City would like to maintain historical information for the following list of data.

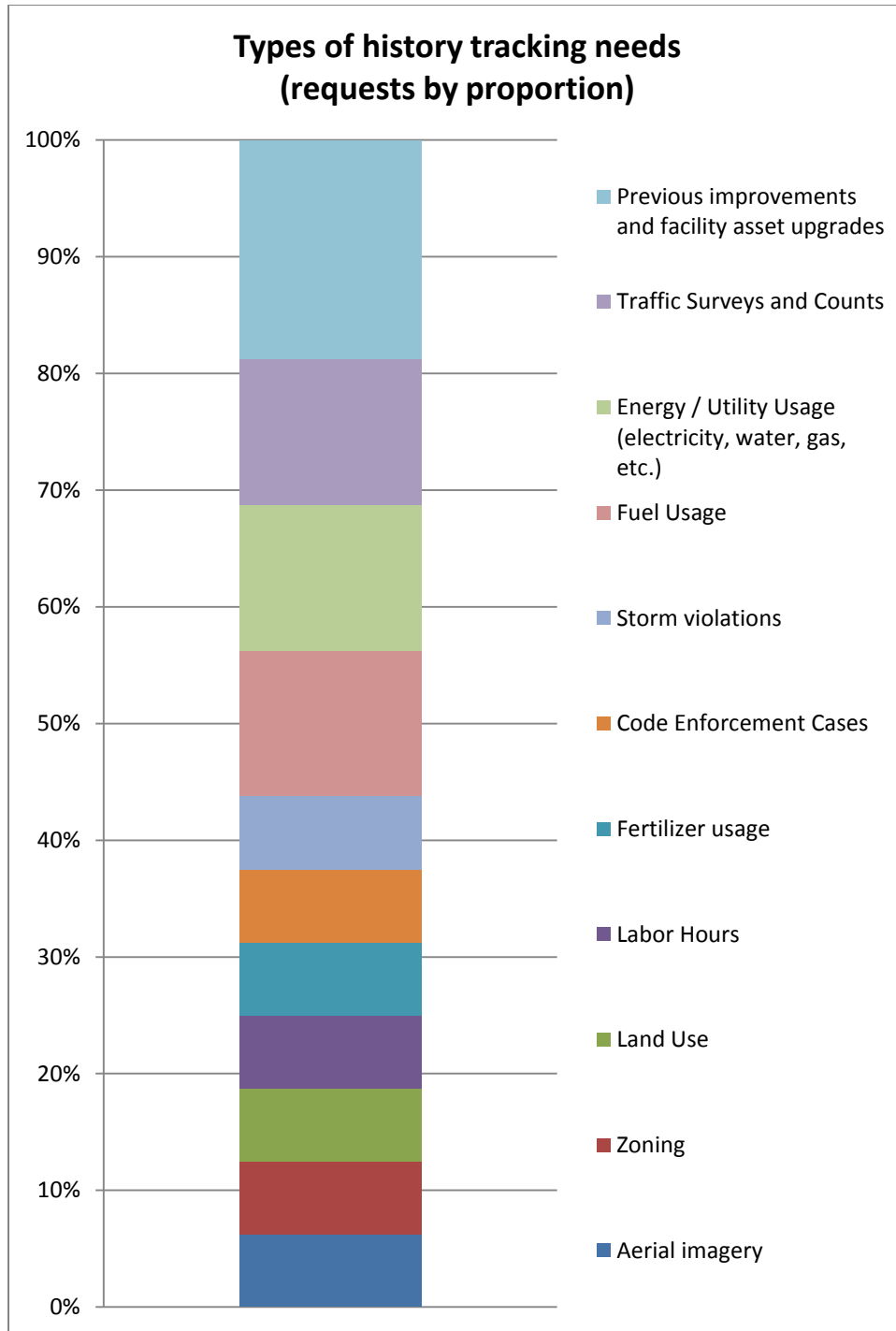
1. Information about previous improvements or upgrades performed at a site or facility (drawings, project descriptions, etc.)
2. Traffic Surveys and Counts
3. Energy / Utility Usage (electricity, water, gas, etc.)
4. Fuel Usage
5. Storm Violations

6. Code Enforcement Cases
7. Fertilizer Usage
8. Labor Hours
9. Land Use
10. Zoning
11. Aerial Imagery<sup>3</sup>

The following chart shows the number of requests for tracking various historical data as a percentage. From the chart, there is a higher need for users to have easy access to information about previous improvements done at a site. Note that this includes previous upgrades performed within a certain facility. Although these are separate requests, they have been categorized the same as they have the same overall theme.

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<sup>3</sup> A good collection of historical aerals are already present. They need to be made better available in end user applications.



**Figure 3: Types of History Tracking Needs**

Table 4 in Section 3 includes recommendations for improving data and visualizing trends that will help address the needs in this area.

### Access Scanned Documents

The ability to access scanned documents when performing workflows is a major need for the users in the City. Current applications such as Magnet and MapGuide provide limited functionality. The need is two-fold.

1. The collection of scanned documents available within Laserfiche needs to be expanded. These includes but are not limited to:
  - a. Older building permits (currently in the process of being scanned)
  - b. Traffic intersection plans
  - c. Traffic counts
  - d. Mechanical plans
  - e. As-builts
  - f. Plant Lists
  - g. Improvement plans
  - h. Recorded deeds
  
2. Documents within Laserfiche need to be organized more efficiently with appropriate folder, project and document naming conventions. This will help GIS applications easily retrieve documents when users make requests.
  
3. The City needs to establish a consistent way of storing scanned documents, so that the collection is always up to date.

### Internal Data Sharing and Coordination

A recurring theme of need for the City is for their business processes to include better ways to communicate, notify, or alert other groups in the organization during or after a certain task in a workflow is complete. An example of this is being able to add key notes for certain assets that can be viewed by all effected departments to facilitate and increase the sharing of information. The finance group would like to receive notifications when new facilities are added by other groups in Cityworks, in order to track billing information in a more immediate and concise way. Certain departments have data that could be useful within other departments for their workflows. Table 1 below, shows examples of data that can be shared between groups, based on feedback received during the Needs Assessment. Note that some of this data does not currently exist in GIS format. Development of GIS data, establishing workflows to keep the data current, and making the data available within a GIS application will help meet some of the data sharing needs mentioned during the Needs Assessment. The Data Inventory Matrix on Page 22 provides more information that helps identify data needs of various groups and data stewards that can assist with providing that information.

<b>Data</b>	<b>Available With</b>	<b>Requested By</b>
<b>New Facilities</b>	Multiple	Finance
<b>Creek Trees</b>	Recreation and Community Services	Trees/ROW
<b>Previous and Hardscaped Areas</b>	GIS / LIDAR	Stormwater

<b>Data</b>	<b>Available With</b>	<b>Requested By</b>
<b>Infiltration Basins</b>	PW Design	Stormwater
<b>New Business Licenses</b>	Economic Development, Finance, Magnet	Stormwater
<b>Net New Trees</b>	Trees/ROW	Sustainability
<b>Facility asset upgrades</b>	Facilities	Sustainability

**Table 1: Internal Data Sharing Needs**

In addition to better data sharing, there is also a need for better coordination among various groups, during workflows. For example, the Streets group would like to create work orders only after the Engineering group has created an asset in the GIS (see Page 82). In another example, the Trees group would like their maintenance tasks to be performed earlier during a project that would then trigger other tasks based on pre-established task dependencies (see Page 84). There is a clear need for the City to develop an overall strategy for maintenance tasks and streamline the use of Cityworks.

### **One Stop Shop Application**

City staff would like to improve efficiency and are looking for a solution that minimizes the number of applications they use to perform daily workflows. They prefer to use one application that provides all the information they need as part of research, query, and verification processes. The City had envisioned the Magnet software application to fulfill this need. However, that solution has not fully satisfied the City’s needs and the City is looking to replace Magnet with a newer system.

The City needs a modern solution that meets GIS information lookup needs as well as integrates well with other business systems such as permitting, billing, document management, utility data management, and asset management, etc.

### **Better Public Outreach**

The City presently does a good job of providing information to the public via public facing maps and apps on the City’s map gallery. However, there are needs beyond the current capabilities for additional information to be made available to the public. Examples include being able to provide permit status, improvement plan documents, etc. for the public to view without having to visit or call the City. Third party applications such as BuildingEye provide this capability. Groups such as Recreation and Community Services are looking for improved ways to provide information to the public regarding events and activities in the region. The City would like to be more effective when sending notices to its residents about big events that affect traffic, or when there are improvements going on in the City.

Table 4 in Section 3 includes recommendations to address each of the major themes of needs related to GIS Business Processes mentioned above.

## **GIS Applications and Solutions**

### **Magnet**

Magnet CSI is a permitting system the City purchased more than 5 years ago. It is a web application with data hosted in the cloud. The system comes with a GIS interface that allows users to view and interact with spatial information on a map. The system was implemented with the hope that it would fulfill the

need of having a “one stop shop” for all City information. After 5 years of improvements, this application has recently begun to provide the functionality staff needs. There had been multiple issues with the map interface which seemed to lack common features expected in modern GIS viewers. Features on the permitting system side of the application also did not seem to be comparable to similar products that are used in the industry. Although the application has improved, the City needs to replace Magnet completely with a robust alternative from an established vendor of permitting software.

### **MapGuide**

MapGuide is a legacy GIS web application that is widely used in the City. Continuing to use MapGuide is problematic as it is no longer supported or updated by ITC and the data is out of date. The City staff continue to use it because it is familiar, easy to use, readily available to access, and provides more functionality than Magnet. This legacy GIS application built on older technology needs to be replaced with a modern alternative. The City originally intended for the Magnet application (see above) to replace MapGuide. With the recent improvements to Magnet, the City is looking to transition staff in to using Magnet and deactivate MapGuide altogether.

### **Cityworks**

Cityworks is an asset and maintenance management system the City has used successfully for asset maintenance and inspection operations over the past 7 years. Aside from a few groups such as Grounds, Traffic Signals, and Fleet that are yet to begin using Cityworks, most other groups that are in charge of maintaining assets such as Storm, Streets, Trees, etc., are using Cityworks. While Cityworks in general works well for the City, its mobile application options are lacking some much needed key functions. Cityworks mobile applications are cumbersome and have limited functionality (e.g. they only allow updating work orders from the field). Field crews are looking for added capabilities such as being able to “follow” a crew member by using GPS technology. Combined with the connectivity issues (see below) the City faces, this has led to limited usage of Cityworks mobile applications by field crews who find it more convenient to write information on paper in the field and enter information in to Cityworks, back in the office. Field crews need a user friendly, more streamlined experience when updating information while performing work in the field.

### **Laserfiche**

Laserfiche is the City’s document management system. The City stores scanned documents such as drawings, project files, planning documents, etc., in this system. Applications such as Magnet and MapGuide can retrieve these documents. As mentioned earlier, there is a great need for the City to look at fully leveraging the power of this system, by scanning documents that are not in the system yet and making these available to interact with GIS applications.

### **Comcate**

Comcate is a Citizen Engagement Platform that the City mainly uses to receive code enforcement related complaints. The City is planning to replace this system with a Customer Relationship Management (CRM) system in the near future.



### 3D GIS

The City is currently partnering with Esri on a project to create a 3D model of the entire City. This includes creation of an application for front counter staff to answer questions and help customers visualize property details such as setbacks, roof heights, etc. The City currently seems interested in utilizing more 3D GIS functionality to help with workflows; however, at this time, the City does not have trained staff in this area.

### Internet of Things (IoT)

The City is leveraging IoT by partnering with Waze<sup>4</sup>, a community based traffic and navigation application that provides real-time traffic and road information. The City is interested in utilizing this data to help route field crews, assist in planning traffic signal timings, and during events that impact traffic flow. The City is working towards establishing a two-way data sharing agreement with Waze. The City would like to evaluate the data that will be obtained as part of this agreement and create a strategy to leverage the data within the City's workflows. The City hopes to use real time and historic data from Waze to help schedule street repairs within Cityworks, respond to unplanned road closures or emergencies, and adjust traffic signal timings.

### Public Web Apps

The City has a sizeable gallery<sup>5</sup> of public facing GIS web applications that provide useful information such as Permit Parking Locations, Police Beats, Street Sweeping and Garbage Collection Schedules, Development Activities, Capital Improvement Projects, Street Closures, Parks Finder, and more. These applications are based on Esri web application templates. The City is interested in upgrading these applications on a regular basis, if an updated version of the template is available from Esri. As mentioned under the Better Public Outreach section on Page 14, one major gap in providing information to the public is the ability to allow the public to lookup permit status and other project related information such as drawings. While applications such as BuildingEye have been identified as solutions that can provide this capability, the need for a complete set of scanned documents and the ability to organize these documents and permits in a way that is easily retrieved, still remains.

### Open Data Portal

The City has setup a GIS Open Data Portal<sup>6</sup> to ensure their GIS data is as transparent, discoverable, and as usable as possible. Open Data provides opportunity for better data sharing, communication and collaboration with other entities or agencies. It can also help spawn innovation in the City as other companies can use the data to provide better services and information to the area residents. The current Open Data Portal is an older version and needs to be updated.

### GIS Training

City staff who use Cityworks have expressed a need for training sessions that will refresh their memory on modules and tools that are not used on a daily basis but are needed when there are newer hires that

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<sup>4</sup> <https://www.waze.com/>

<sup>5</sup> <http://gis.cupertino.org/webapps/>

<sup>6</sup> <http://gis.cupertino.opendata.arcgis.com/>

need to be trained or when the need arises during a workflow. To address this, the City has begun creating videos for Cityworks staff on topics such as creating attached and unattached workflows. The City hopes that these videos will act as quick refreshers for City staff when they need to remember a workflow that has not been performed for a while.

With the recent improvements to Magnet, the City is looking to deprecate MapGuide and fully adopt Magnet as the default GIS viewer for the City. This will require training to be provided so that users can transition smoothly to the new system and continue performing workflows without interruption. The City is considering using training videos and preparing training documents to help in this transition as well.

The City would like to ensure staff are kept informed on apps that the City publishes or updates on a regular basis. While some apps are focused for the needs of a specific user group or department, there are times when staff from other departments can use the information due to overlapping needs and workflows.

## Section 3 – Framework for Change

Based on the findings in the Needs Assessment (Section 2) this section introduces several concepts that are intended to help the City enhance GIS service delivery, expand GIS accessibility and use, achieve greater GIS integration within City business processes and systems, increase GIS visibility and organizational awareness of the technology, effectively deploy GIS in the organization, and optimize the use of resources such as people, processes and technology to elevate how GIS is leveraged in the organization. The concepts are also organized within the key areas discussed during the Needs Assessment; GIS Infrastructure, GIS Data, GIS Business Processes, GIS Applications and Solutions, and GIS Training.

### GIS Infrastructure

#### GIS as a Platform

The City will need to begin thinking of its current GIS as just being a System of Record to becoming a System of Engagement<sup>7</sup>. Systems of Record are the traditional process and database oriented transactional systems with central repositories of records that users access as part of workflows. The City's GIS already functions this way. Systems of Engagement are people-focused applications that are designed to equip, enable and empower users with the tools they need to interact with the business. Systems of Engagement overlay and complement Systems of Record and harness any number of technologies including mobile, social, cloud and big data innovation<sup>8</sup>. The move from Systems of Record to Systems of Engagement is a larger industry trend that has engulfed all kinds of systems and GIS is no exception. The most common way a System of Engagement is built is by implementing a portal that users interact with to obtain and share information products on demand.

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<sup>7</sup> <http://www.esri.com/esri-news/arcnews/winter16articles/arcgis-is-a-system-of-engagement-and-a-system-of-record>

<sup>8</sup> <http://www.mainstream-tech.com/news-press/systems-of-record-vs-systems-of-engagement/>

The following figure<sup>9</sup> illustrates the shift of traditional systems from Systems of Record to Systems of Engagement. (Note – Figure is not specific to GIS systems but is to be used to understand the trend.)

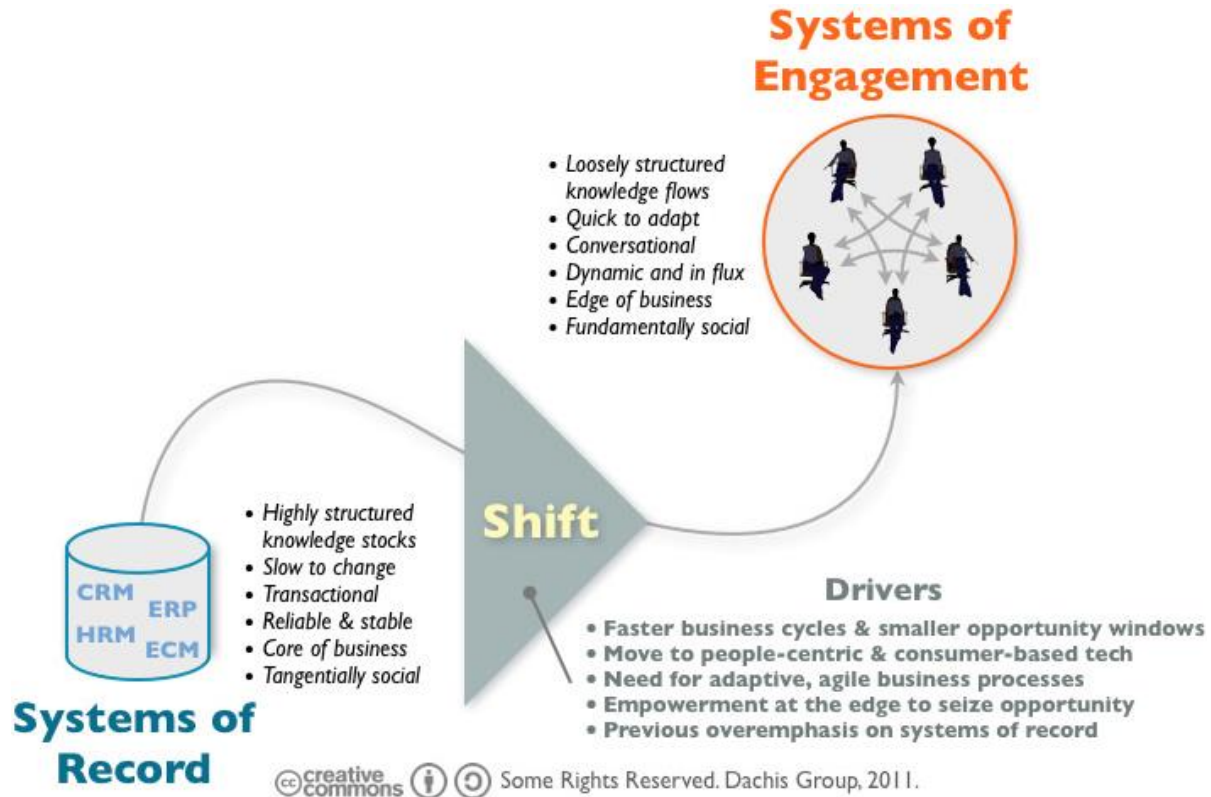


Figure 4: Systems of Record vs Systems of Engagement

In the current GIS world, ArcGIS Online and the Portal for ArcGIS products provide the City the ability to implement GIS as a platform and create a System of Engagement. The City already uses ArcGIS Online which is a cloud based portal. Based on the City’s vision for the future and the current evolution in GIS technology, the City will continue to leverage ArcGIS Online for its platform capabilities. It is further recommended that the City monitor the Portal for ArcGIS product as it matures and consider implementing this product if significant advantages of an on-premise Portal become evident in the future.

### GIS Architecture Additions

This GIS architecture shown in Figure 1 on Page 8 essentially remains the same, but a few key additions are made. These include:

- **GeoEvent Processor Extension<sup>10</sup>** – The ArcGIS GeoEvent Processor Extension for Server will position the City to take advantage of real-time streaming data. This in combination with a platform approach opens up many opportunities for the City to operate at a higher level than

<sup>9</sup> Image credit: Dachis Group, 2011. <https://www.flickr.com/photos/dionh/8200562910>

<sup>10</sup> As of the writing of this report, GeoEvent Processor extension is known to be resource intensive. This may necessitate the City upgrading its Production ArcGIS Server specs to ensure reliable performance.

before by conducting predictive analytics and support actionable insights based decision making in the areas of emergency operations, maintenance planning, allocation of resources and assets and more. The extension is recommended to be installed in the Production ArcGIS Server.

- **Image Extension** – The ArcGIS Image Extension for Server will allow the City to publish image services of its historical aerial imagery which is needed by several groups for reference and planning purposes. The extension is recommended to be installed in the Production ArcGIS Server.
- **App Expansion** – The GIS infrastructure will support an expanded set of GIS applications that will lead to a robust and well-rounded GIS. Support for existing high use applications such as Cityworks, ArcGIS Desktop, and existing web applications in ArcGIS Online and for the public, will continue without any disruption. However, apps that enable some key capabilities will be introduced. These include Operations Dashboard for decision support, Insights for ArcGIS for analytics, CityEngine for 3D GIS capabilities, and public apps for public outreach and constituent engagement. In addition, a new permitting system with an integrated GIS viewer that provides the functionality required by the City will be supported as well.

### IT Governance

GIS is inherently part of the information technology domain. As a result, the City's IT governance policies should cover the GIS especially when operating as a platform. This helps ensure that GIS solutions and implementations are managed correctly. Essentially, the IT Governance of GIS should include the following:

- **Software upgrade plan** – This includes a schedule for planned software upgrades, migration process and backup and rollback strategies.
- **Testing plan** – This includes conducting testing whenever there are software upgrades or changes and enhancements to applications and/or services.
- **Data governance** – Ideally, data should be maintained by data stewards within the various departments and groups, and centrally managed by the GIS division. This helps create ownership of the data and also helps create authoritative content. The role of the GIS division would be to ensure data quality, integrity and usability. IT governance ensures availability and adherence to overall data security policies.
- **Training** – Managing a GIS platform is not a trivial undertaking. It not only requires additional technical skills but also requires a shift in thinking patterns and approach to the organization's GIS. IT governance should include investments in training that equip staff to not only operate the GIS platform but also empower them to steer the GIS for long-term success.

### GIS Visibility

The City has indicated that they would like GIS to be front and center in everything they do by making it an integral part of the new City website. It is recommended the City consider increasing visibility of GIS in the City website by adopting both a geocentric application pattern as well as a geoenabled application pattern. The geocentric application pattern allows embedding of existing map centric GIS applications and web maps in strategic locations on the website. A geoenabled application pattern takes more design effort but offers deeper integration of GIS with the City's business functions that are performed

via the City’s website. In this pattern the GIS provides information as a secondary function with other business systems providing information as a primary function to the web page. A map may or may not be present in this case. The GIS Applications and Solutions section on Page 31 provides more information about these application patterns.

### Current Configuration Changes

The following include recommended configuration changes to the current system based on findings of the Needs Assessment.

#### SDE Roles

It is recommended that the City use custom database roles to assign privileges to users. Currently, the SDE uses built-in database roles in SQL Server to give users access to the data. A more efficient model is to simplify the process by introducing custom database roles in SQL Server and managing user privileges to various feature classes via ArcCatalog. For example a database role called “GIS\_Viewer” can be created in SQL Server for users with read-only privileges. A database role called “GIS\_Editor” can be created in SQL Server for users with editing privileges. This can be done the next time the City upgrades their SQL Server software or when there is any other major change in the GIS system.

#### GIS Service Instances

It is recommended the City update the default number of minimum and maximum pooled instances for its high usage and high availability services. This helps increase performance and availability of these services. The following table shows services that were found to have a high usage along with recommended instances.

Service Name	Current Min – Max Instances	Recommended Min – Max Instances
2015 Aerial	1-2	2-4
2015 Aerial Image Service	1-2	2-4
CSI_ImageryReferenceOverlay	2-4	4-8
DBO_tran_Road_Locator	1-2	2-4
CityworksGeoDataService	1-2	2-4
CW_Median	1-2	2-4
CW_stagnettie	1-2	2-4
CW_StormTest	1-2	2-4
CW_StormTest_FS	1-2	2-4
CW_Streetlight	1-2	2-4
CW_Traffic	1-2	2-4
CW_Traffic_FS	1-2	2-4
CW_TrafficSignal	1-2	2-4
CW_Tree	1-2	2-4
CW_Tree Ferrant	1-2	2-4
CW_Tree FS	1-2	2-4
Utilities/Geometry	1-2	4-8

**Table 2: Recommended Service Instances**

### *Secure Service Creation*

For Cityworks, it is recommended the City use a generic user account for publishing services, as a best practice. Currently, an administrative user account is being used to publish services.

The above recommended changes are scheduled in Project 1B of the Implementation Plan.

### *GIS Software Upgrades*

GIS software is evolving at a rapid pace with changes in overall information technology. It is recommended that the City consider upgrading to the latest version of ArcGIS Server and Desktop software on a bi-annual basis.

The Implementation Plan includes a schedule for annual software upgrades for Cityworks and bi-annual software upgrades for ArcGIS Server, SDE and Desktops.

### **GIS Data**

The City has done a lot of great work in ensuring GIS data accuracy, consistency, and designing data structures that provide and help maintain relevant information for users. The needs assessment revealed additional needs and gaps in the area of GIS data development. These are presented in the Data Inventory Matrix below, along with recommended work to be done.

The Priority Year/Project Number column shows the schedule and project in which the dataset is to be updated in the implementation timeline. The project number includes the year number and alphabetic code. For example in Project '1A', '1' is the priority year and 'A' is the alphabetic code. An entry of 'ongoing' means the dataset is expected to be maintained on a continuous basis with no specific start/end project dates.

While the table is ordered by priority year, project codes may not always be in order. This is because project numbers are distributed between projects for data, infrastructure and applications throughout the plan.

**Data Inventory Matrix**

Layer Name	% Complete	Data Source and/or Data Steward(s)	Business Process or Application	Needs / Gaps	Recommendations	Priority Year / Project Number
Parcels	100%	County	Core dataset that the City relies on for numerous workflows such as property information lookup, permitting, code enforcement, building inspections, addressing, planning workflows, maintenance, etc.	Sometimes, staff come across parcels where property information is not up to date. During such instances, staff refer to Metroscan to verify parcel information.	Upon review, current process of keeping parcel information up to date (monthly parcel queries and quarterly Metroscan data integration) is working well. The City may consider increasing the frequency of Metroscan data integration.	Ongoing
Condominiums	100%	County	Property information lookup, noticing, permitting, etc.	Sometimes, staff come across parcels where property information is not up to date. During such instances, staff refer to Metroscan to verify parcel information.	Upon review, current process of keeping parcel information up to date (monthly parcel queries and quarterly Metroscan data integration) is working well. The City may consider increasing the frequency of Metroscan data integration.	Ongoing
Primary Address Points	98%	Building	Core dataset that the City relies on for numerous workflows such as property information lookup, permitting, code enforcement, building inspections, addressing, planning workflows, maintenance, etc.	None	N/A	Ongoing
Secondary Address Points	98%	Building	Core dataset that the City relies on for numerous workflows such as property information lookup, permitting, code enforcement, building inspections, addressing, planning workflows, maintenance, etc.	None	N/A	Ongoing
Current Land Use (table)	98%	Planning	Planning	None	N/A	Ongoing
Traffic Calming Device	85%	Traffic Engineering, Street Operations	Transportation planning, inspections, maintenance	Data is incomplete	Update on as-needed basis	Ongoing

Layer Name	% Complete	Data Source and/or Data Steward(s)	Business Process or Application	Needs / Gaps	Recommendations	Priority Year / Project Number
Traf_Cabinet	70% missing attribute data	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Traf_InPavementCrosswalk	70% missing attribute data	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Traf_MeterEnclosure	70% missing attribute data	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Traf_PedHead	70% missing attribute data	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Traf_PullBox	50% Missing features and attributes	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Traf_RadarSign	70% missing attribute data	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Traf_SignalHead	70% missing attribute data	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Traf_WarningBeacon	70% missing attribute data	Traffic Engineering	Maintenance, inspections, visualization	Data is incomplete	Update on as-needed basis	Ongoing
Park_Furnishing	50% Missing features and attributes	Grounds	Lookup park furnishings to answer calls and requests for information	Park furnishing data (e.g. electric outlets, dog poop dispensers, bbq stands, etc.) needs to be available in Cityworks	<ul style="list-style-type: none"> <li>• Train Grounds staff in Cityworks.</li> <li>• Populate data models already built and implement in Cityworks</li> </ul>	1D
Park_GroundCover	50% Missing features and attributes	Grounds	Park maintenance	Park furnishing data (e.g. electric outlets, dog poop dispensers, bbq stands, etc.) needs to be available in Cityworks	<ul style="list-style-type: none"> <li>• Train Grounds staff in Cityworks.</li> <li>• Populate data models already built and implement in Cityworks</li> </ul>	1D
Park_Structure	50% Missing features and attributes	Grounds	Park maintenance	Park furnishing data (e.g. electric outlets, dog poop dispensers, bbq stands, etc.) needs to be	<ul style="list-style-type: none"> <li>• Train Grounds staff in Cityworks.</li> <li>• Populate data models already built and implement in Cityworks</li> </ul>	1D



Layer Name	% Complete	Data Source and/or Data Steward(s)	Business Process or Application	Needs / Gaps	Recommendations	Priority Year / Project Number
				available in Cityworks		
Park_WasteContainer	50% Missing features and attributes	Grounds	Park maintenance	Park furnishing data (e.g. electric outlets, dog poop dispensers, bbq stands, etc.) needs to be available in Cityworks	<ul style="list-style-type: none"> <li>• Train Grounds staff in Cityworks.</li> <li>• Populate data models already built and implement in Cityworks</li> </ul>	1D
ParkRecreation_Area	100%	Parks	Lookup park capacity to answer calls and requests for information	Need to be able to understand park capacity for event planning and answering calls such as electric outlet availability	<ul style="list-style-type: none"> <li>• Update layer with required attributes and make available in GIS</li> </ul>	1D
Irrigation valves	0%	Grounds	Maintenance, inspection	Feature data model in Cityworks is in place. Grounds needs to start adding inventory and populating data	<ul style="list-style-type: none"> <li>• Populate data models already built and implement in Cityworks</li> </ul>	1D
Building Facility Assets (boilers, a/c units, phone binding posts, etc.)	0%	Facilities	Tracking upgrades, maintenance, inspection	Data does not exist	<ul style="list-style-type: none"> <li>• Design data models for Cityworks incl. fields such as building sq. footage, year built, address, etc.</li> <li>• Collect data related to assets within City owned facilities.</li> <li>• Publish services</li> <li>• Deploy for maintenance in Cityworks</li> <li>• Link assets to financial software</li> </ul>	1F
Easements	30%	Engineering	CIP, development, maintenance, inspections	Data incomplete	<ul style="list-style-type: none"> <li>• Complete inventory</li> <li>• Establish day forward process and workflow</li> </ul>	1H
Traffic Legend	85%	Traffic Engineering, Street Operations	Transportation planning, inspections, maintenance	Data is incomplete	City considers this high priority and is looking to hire interns to capture data. No change in recommendation.	2C

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Layer Name	% Complete	Data Source and/or Data Steward(s)	Business Process or Application	Needs / Gaps	Recommendations	Priority Year / Project Number
Traffic Sign Support	85%	Traffic Engineering, Street Operations	Transportation planning, inspections, maintenance	Data is incomplete	City considers this high priority and is looking to hire interns to capture data. No change in recommendation.	2C
Traffic Sign	85%	Traffic Engineering, Street Operations	Transportation planning, inspections, maintenance	Data is incomplete. Also, traffic sign points need better symbology in the map viewer	City considers this high priority and is looking to hire interns to capture data. No change in recommendation.	2C
Water infrastructure (includes underground water infrastructure assets, and water meters)	0%	SJWC, CalWater, CSD	Utility billing, maintenance, inspections, construction, tracking usage, determine ownership	Data does not exist. Data would be useful for reference and comparison of City data	<ul style="list-style-type: none"> <li>• Continue to work with water agencies to obtain their data</li> <li>• Establish a data sharing agreement that would provide updates on a yearly basis</li> <li>• Establish a workflow to update GIS with yearly changes</li> </ul>	2D
Trees	90%	Trees/ROW	Lookup tree location and information, maintenance, inspections, construction. Reporting and tracking, climate action plan	Need to understand how many new trees were planted. Also database of Private Development Trees would be nice to have. Data from Recreation and Community Services needs to be added to inventory.	<ul style="list-style-type: none"> <li>• Make updated tree data available to other groups using GIS.</li> <li>• Provide users ability to query trees to see what new ones were added (e.g. query by date).</li> <li>• Work with Planning to access private development trees and create a workflow to add this information regularly</li> <li>• Update layer with data from Recreation and Community Services.</li> </ul>	2E
Sewer infrastructure assets (pipes, manholes, cleanouts, etc.)	0%	Cupertino and Sunnyvale Sanitary District	Lookup sewer infrastructure locations	Data does not exist. Data would be useful for reference and comparison of City data	<ul style="list-style-type: none"> <li>• Continue to work with sanitary districts to obtain their data, and make available in GIS.</li> <li>• Establish a data sharing agreement that would provide updates on a yearly basis</li> <li>• Establish a workflow to update GIS with yearly changes</li> </ul>	2F
Grey Pipe Property Layer	0%	Planning	Magnet	Data does not exist. Needs to be available as a	<ul style="list-style-type: none"> <li>• Create layer with required attributes and make available in GIS</li> </ul>	2G

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Layer Name	% Complete	Data Source and/or Data Steward(s)	Business Process or Application	Needs / Gaps	Recommendations	Priority Year / Project Number
				layer in Magnet		
CIP Projects	0%	PW CIP	Access scanned historical documents of properties and buildings	CIP historical docs are not currently in Laserfiche, but are being stored in network folders	<ul style="list-style-type: none"> <li>Scan historical docs and set up a day forward process to scan and upload to Laserfiche.</li> </ul>	2H
RecordofSurvey_Index	100%	GIS	Permitting, research, reference and information lookup	Need to be able to retrieve and view scanned docs for research and reference	<ul style="list-style-type: none"> <li>Scan documents in to Laserfiche</li> </ul>	2I
History of storm drain violations	0%	PW Stormwater	Visualize and lookup violations. See trends and patterns. Query violations.	Data does not exist in GIS format. Need to query violations by year and severity. Need ability to maintain history	<ul style="list-style-type: none"> <li>Create feature class of storm violations.</li> <li>Add start/end date, violation year and severity fields.</li> <li>Create a web map for interactive viewing and so staff can edit feature service directly instead of spreadsheet and view violations on the map.</li> </ul>	3D
Historical Traffic Surveys	0%	Traffic	Traffic studies and traffic engineering	Data in paper format. Needs to be scanned and be retrievable from applications	<ul style="list-style-type: none"> <li>Scan paper based traffic survey files in to Laserfiche and provide links to features in GIS.</li> </ul>	3E
Trash enclosures	0%	Waste Water Sustainability	Inspections	Data does not exist	<ul style="list-style-type: none"> <li>Convert spreadsheet with trash enclosure information (private and public dumpsters) and create layer with required attributes and make available in GIS</li> </ul>	3F
Pervious and hardscaped areas	0%	LIDAR	Determine areas of water runoff, maintenance, inspections	Need to lookup areas where water runs off	<ul style="list-style-type: none"> <li>Create GIS layer using data from the Trees group.</li> <li>Setup a maintenance schedule</li> </ul>	3G
Electric meters	0%	PG&E	Lookup electric meter locations	Data does not exist	<ul style="list-style-type: none"> <li>Create layer with required attributes and make available in GIS</li> </ul>	3H
Gas infrastructure (includes underground gas infrastructure assets)	0%	PG&E	Visualization, reference	Data does not exist	<ul style="list-style-type: none"> <li>Field verify PG&amp;E meters</li> <li>Create layer with required attributes and make available in GIS.</li> <li>Establish a data sharing agreement with PG&amp;E that helps provide yearly updates</li> </ul>	3H

Layer Name	% Complete	Data Source and/or Data Steward(s)	Business Process or Application	Needs / Gaps	Recommendations	Priority Year / Project Number
PG&E power boxes	0%	PG&E	Visualization, reference	Data does not exist	<ul style="list-style-type: none"> <li>• Work with PG&amp;E to obtain this data and make available in GIS.</li> <li>• Establish a data sharing agreement to obtain data on a yearly basis</li> </ul>	3H
Historical Code Violations	0%	Code Enforcement	Analysis	Would like to understand patterns and trends of code violation occurrences to better plan out mitigation response.	<ul style="list-style-type: none"> <li>• Create GIS layer of historical code violations.</li> <li>• Use start and end date fields that can be used to construct a timeline view in GIS.</li> <li>• Use GIS to uncover trends, patterns and perform hot spot analysis.</li> </ul>	4C
Well and Water Rights	0%	PW CIP	Look up well and water rights ownership information	Data does not exist	<ul style="list-style-type: none"> <li>• Create layer with required attributes and make available in GIS</li> </ul>	4D
Bridges	90%	Operations	Visualization, reference, maintenance and inspections	Bridge features do not have links to drawings and documents. Bridge maintenance history not being tracked.	<ul style="list-style-type: none"> <li>• Scan and add drawings and documents for bridges to Laserfiche.</li> <li>• Link documents in Laserfiche to bridge features.</li> <li>• Add bridges to Cityworks for maintenance</li> </ul>	4E
Telecom Vaults	0%	AT&T/Verizon	Visualization, reference	Data does not exist, need to see in Cityworks Map	<ul style="list-style-type: none"> <li>• Establish a data sharing agreement with AT&amp;T to obtain data on a yearly basis</li> </ul>	5D
Census Data	0%	Census	Research and information gathering	Need easy access to the data	<ul style="list-style-type: none"> <li>• Obtain data from a demographics provider who can provide customized results per City needs. E.g. Nielsen, cubitplanning, etc.</li> </ul>	5E

**Table 3: Data Inventory Matrix**

## GIS Business Processes

Based on the main business process improvement need themes identified in Section 2, the following table represents recommended changes to enable efficiency in the City’s business processes and empower user workflows.

Business Process Theme	Recommended Improvement
Track and analyze history	<ol style="list-style-type: none"> <li>1. Add start and end date fields for datasets that users are looking to maintain history about. These include data such as storm drain violations, code violations, traffic surveys (see Data Inventory Matrix on Page 22 for more information)</li> <li>2. Provide tools for easily analyzing trends and patterns. Although much of the City's interest lies in maintaining history and visualizing historical data, the following discussion has a broader scope of analyzing trends and patterns in general. This can be applied to historical, static, or real-time data. <ul style="list-style-type: none"> <li>• Basic analysis <ul style="list-style-type: none"> <li>○ Time series <ul style="list-style-type: none"> <li>▪ A minimum of one date field must be present in the feature class. This helps visualize occurrences of an event on a timeline. Two date fields can be used to visualize occurrence of events over a time interval with specific start and end dates.</li> <li>▪ The time slider can be used to explore temporal data interactively, and visualize patterns over time.</li> </ul> </li> <li>○ Use the Web AppBuilder chart widget for simple charting. Combining maps and charts can be a very powerful way to tell a story. The following provide some guidance for charting. <ul style="list-style-type: none"> <li>▪ Bar charts - use for comparing data across categories. (E.g. number of violations by code category).</li> <li>▪ Line charts - use for visualizing trends over a period of time. (E.g. water usage over the last year).</li> <li>▪ Pie charts - use to show relative proportions. (E.g. age distribution by neighborhood for planning community events).</li> </ul> </li> </ul> </li> <li>• Advanced analysis - Note that some of these suggestions may require</li> </ul> </li> </ol>

Business Process Theme	Recommended Improvement
	<p>development of custom tools, or they may be found in upcoming Esri products such as Insights for ArcGIS<sup>11</sup>, or business systems some of the user groups are looking to purchase such as fuel management software, utility management software, etc.</p> <ul style="list-style-type: none"> <li>○ Evaluate the Insights for ArcGIS product which is anticipated to be released in fall 2016. The City could participate in the early adopter and beta programs for this software, and evaluate how it will fit the City's need.</li> <li>○ Perform hot spot analysis over time. Emerging hot spot analysis<sup>12</sup> can help understand trends by finding new, intensifying, diminishing, and sporadic hot and cold spots. The Insights for ArcGIS product also includes tools to perform hot spot analysis.</li> <li>○ Organize multiple bar charts on a dashboard help provide a quick comparison of multiple categories and provide greater insight into patterns by answering many questions at once.</li> <li>○ Combine a line chart with a bar chart to visualize trends that help identify when there were spikes or declines (e.g. in water usage).</li> <li>○ Use scatter plots to understand the relationship between different variables. (E.g. relation between code violation occurrences and neighborhood demographics). Scatter plots can be accentuated with bubbles to show concentrations of data points.</li> <li>○ Create Gantt charts which can be used in the CIP viewer to provide information about project start and end dates and key milestones.</li> <li>○ Create box and whisker plots which can be used to identify distributions in the data, and understanding skews and outliers.</li> </ul> <p>3. Publish image services of historic aerials that can be used within web applications for staff to be able to view changes along time.</p>
<p>Access scanned documents</p>	<p>1. Scan complete sets of documents in to Laserfiche. Section 4 includes a schedule for documents that need to be scanned by priority.</p> <p>2. Organize documents within Laserfiche for easy retrieval by web applications.</p> <p>3. Establish workflows for scanning and uploading documents to Laserfiche as</p>

<sup>11</sup> <http://www.esri.com/products/arcgis-capabilities/insights>

<sup>12</sup> <https://pro.arcgis.com/en/pro-app/tool-reference/space-time-pattern-mining/learnmoreemerging.htm>

Business Process Theme	Recommended Improvement
<p><b>Internal Data Sharing and Coordination</b></p>	<p>part of regular business processes</p>
	<ol style="list-style-type: none"> <li>1. Provide users access to simple web maps or apps that allow them to edit feature services (e.g. CIP managers can update project information). The feature services must only be ones they are responsible for maintaining and sharing information with other groups. This makes the workflow for updating the information faster and more efficient.</li> <li>2. Configure Cityworks to send notifications to designated users in various groups when changes occur to data they are interested in (e.g. net new trees, facility upgrades, etc.). This can be further enhanced to generate reports with more detailed information (e.g. quantity of light bulbs changed within a facility and their wattage).</li> <li>3. Use the Data Inventory Matrix provided on Page 22, to meet data needs of various groups. This includes enhancing existing applications with additional pertinent data as requested. (E.g. Cityworks, Parks and Rec finder, etc.)</li> <li>4. Integrate GIS with business systems being used or needed by various groups. This includes:               <ol style="list-style-type: none"> <li>a. Permitting System - Multiple</li> <li>b. PerfectMind – Recreation and Community Services</li> <li>c. Cityworks – Finance, Grounds</li> <li>d. Fuel Management Software – Fleet</li> <li>e. Lucid – Sustainability</li> <li>f. WebEOC – Emergency Preparedness</li> </ol> </li> <li>5. Streamline workflows for field crews. This includes:               <ol style="list-style-type: none"> <li>a. Refine Cityworks forms to allow field workers to better capture data.</li> <li>b. Make GIS assets available to field workers prior to their creating work orders in the field.</li> <li>c. Develop a strategy to chain schedules reorganize work that will streamline Cityworks workflows</li> </ol> </li> </ol>
	<ol style="list-style-type: none"> <li>1. Replace Magnet with a permitting system that has proven functionality the City is looking for. Ensure the new permitting system integrates well with Enterprise GIS systems and consumes REST services from ArcGIS for Server</li> </ol>
<p><b>Better Public</b></p>	<ol style="list-style-type: none"> <li>1. Enhance existing public applications with data improvements per the Data</li> </ol>

Business Process Theme	Recommended Improvement
Outreach	<p>Inventory Matrix on Page 22.</p> <ol style="list-style-type: none"> <li>2. Implement BuildingEye that is able to provide the public access to internal documents and status information on various applications. Establish a way for the public to use this application and subscribe to GIS data notifications similar to the eNotifications function on the City’s home page.</li> <li>3. Build story maps that support HR, Recreation and Community Services, and Community Outreach groups.</li> <li>4. Enhance City website by embedding maps and apps and also by integrating information from the GIS at a deeper level.</li> </ol>

Table 4: GIS Business Processes

## GIS Applications and Solutions

When deploying applications, the City may choose from one of three application patterns. These include geocentric, geoenabled and composite applications. Figure 5 below displays the differences between these applications.

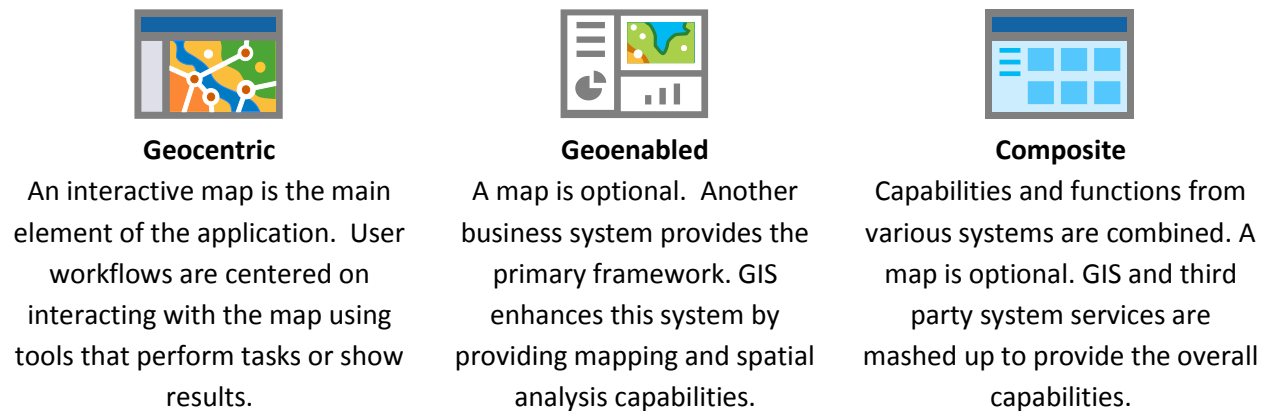


Figure 5: Application Patterns

The following is a list of applications that are anticipated to fill some of the needs and gaps in business processes discussed in the previous section. Applications include both custom and out-of-the-box solutions that follow the application patterns mentioned above. Note that this list does not include applications the City plans to or is already in the process of implementing per their work plan. However, Section 4 includes projects to implement the applications listed below as well as applications in the City’s work plan.

### Public CIP Viewer

This application will allow the City to disseminate information regarding CIP projects to the public using a streamlined workflow. CIP project managers will have access to editable GIS services that will help them to publish authoritative information regarding status of CIP projects directly to the public. This is a geocentric application.



### Insights for ArcGIS

The main purpose of this application is to enhance the City’s ability to visualize and analyze patterns and trends. This application can be used for historic, static and real-time data<sup>13</sup> as well. This application is recommended to be implemented based on current industry trends where focus has begun shifting from traditional analytics to predictive analytics, for better decision making. This is a geocentric application.

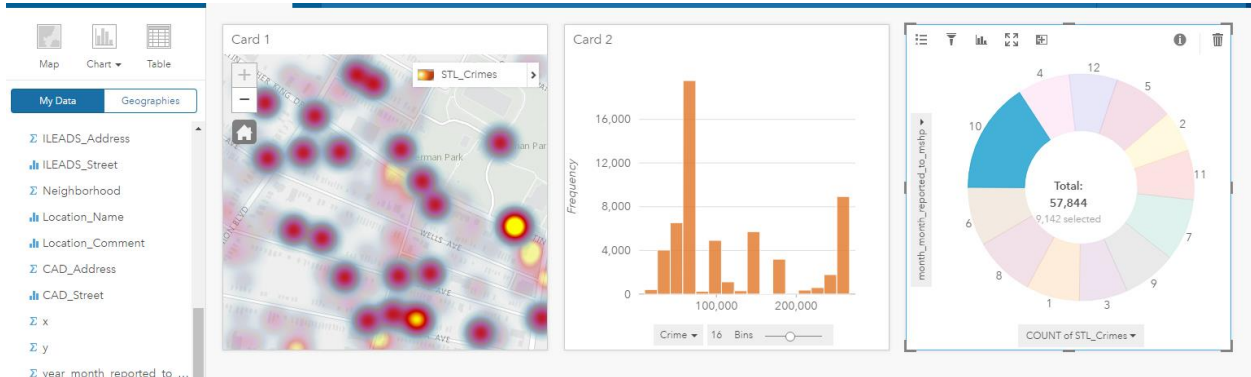


Figure 6: Insights for ArcGIS

### Story Maps

Story Maps combine maps with narrative text, images, and videos and provide a powerful way to showcase and draw attention to a variety of topics and tell a story. Story maps are ideal for needs of groups who want to publicize or showcase the amenities or benefits of the City. These are geocentric applications.

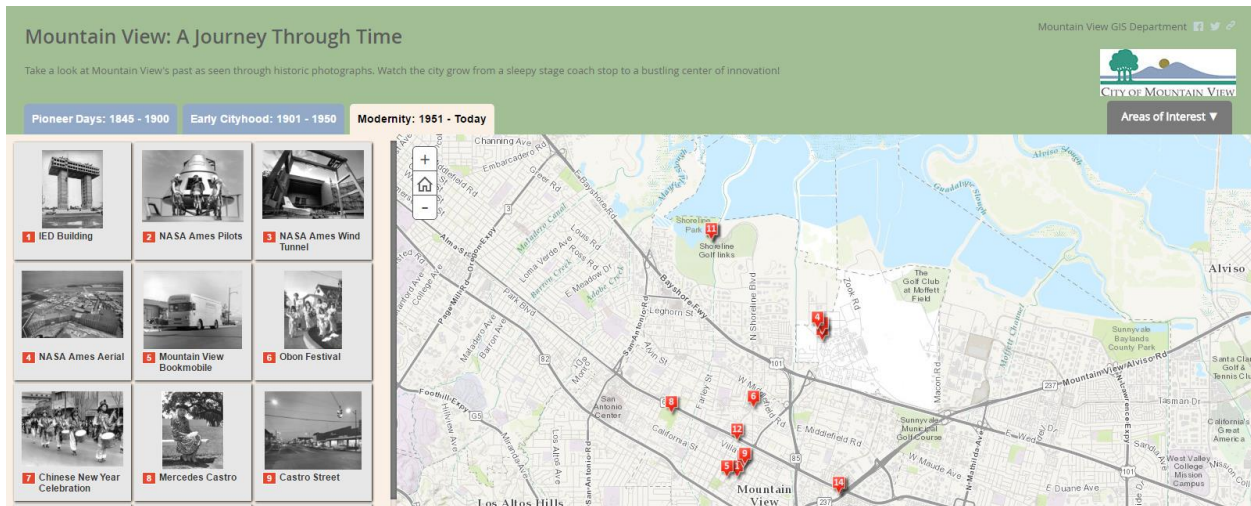


Figure 7: Story Map Example

<sup>13</sup> See note on Page 58

### 3D Apps

The City has an upcoming project that will include building out the 3D city model. The City can leverage this data and build other applications for planning and sustainability. The City can use the 3D data to analyze high solar radiation surfaces in the City to help with energy saving measures or visualize zoning violations or height restrictions in the City for better policy making, or compare redevelopment projects. These are geocentric applications.

### GIS Training

With respect to GIS training, it is recommended that the City continue to develop videos and training documents for the benefit of Cityworks users who need a quick refresher on modules and tools. Similarly, it is recommended the City continue to develop videos and training materials for the Magnet system that will help MapGuide users transition well. Providing the above trainings on at least an annual basis would not only help current staff but also help with the training and onboarding process of new recruits. The annual trainings can include introducing staff to new apps or updates to existing apps they can take advantage of as part of their workflows.

## Section 4 – Implementation Plan

The following is the five-year Implementation Plan for the City to put into effect the concepts and framework outlined in Section 3 of this Strategic Plan. Each year of the plan represents an implementation phase and also corresponds to a Fiscal Year in the City’s budget cycle. The Implementation Plan includes projects and trainings, with anticipated high level tasks, resources and cost estimates. A project consists of one or more tasks. Higher priority projects are performed in earlier phases of the plan. The timeline for projects and trainings is shown in Figures 8-12. The timeline also groups projects in to the Framework for Change categories introduced in Section 3.

**Notes:** Project tasks and estimates are high level. Providing technical implementation steps for each task or detailed scopes of work for every project is outside the scope of this report. Project dependencies are mentioned where applicable and also shown in the yearly project timelines. If a certain project (e.g. Project B) is said to have a dependency on another project (e.g. Project A), it means Project B can occur only after Project A is complete or in other words, Project A is a predecessor to Project B. Project timelines are provided by phase/year and as such dependencies that span over multiple phases/years, are not shown in the charts but mentioned in the project descriptions, where applicable. Project specific trainings are not shown in the timelines. Project costs are included where applicable and only if they appear in the City’s work plan, and/or include software or hardware purchases.

### Phase 1 (Year 1)

This includes projects for FY 2016-17

#### Project 1A - Upgrade Development Environment (On-Premise)

Isolating computing environments is an architecture best practice which the City already follows. Environment isolation reduces risk and negative impacts of system changes. In this project, the City will

upgrade the development environment. The ArcGIS Server development license on the ARCGISTEST machine will be upgraded to version 10.4 (see Figure 1 on Page 8). Cityworks development license on ARCGISTEST will be upgraded to Cityworks 2015 SP2. The project includes proper unit and integration testing. Cityworks development version is anticipated to be upgraded on an annual basis. ArcGIS software including development server and SDE are anticipated to be upgraded every two years.

Anticipated tasks, resources and include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Development Environment</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	See Project 1C

### **Project 1B - Upgrade Production Environment (On-Premise)**

In this project, the City will upgrade the on-premise Production environment to the latest version. This includes upgrading Production SDE on the GISSVR2 machine (see Figure 1 on Page 8) to version 10.4. The SQL Server Enterprise 2008 R2 on this machine will be upgraded to SQL Server 2014. Custom database roles per recommendations on Page 22 will be implemented. ArcGIS Desktops will be upgraded to version 10.4 as well. The project includes proper unit and integration testing. ArcGIS software including production SDE and desktops are anticipated to be upgraded every two years. This project has a dependency on Project 1A.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade on-premise Production Environment</li> <li>• Upgrade ArcGIS Desktops</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	See Project 1C

### **Project 1C - Upgrade Production Environment (Cloud)**

In this project, the City will upgrade the Production Environment in the Amazon cloud. This will include upgrading Cityworks from version 2014 SP5 to version 2015 SP2, and upgrading ArcGIS for Server Standard 10.3.1 to 10.4. GIS service instances will be adjusted per recommendations in Table 2, and best practices for publishing services will be used per comments on Page 20. A new instance which hosts the Amazon Relational Database Service (RDS) will be added to this environment. The existing SQL Server Express 2008 R2 that is used for two-way replication with on-premise Production SDE will be moved to the RDS instance and upgraded to SQL Server Express 2014 (see Figure 1 on Page 8). The ArcGIS Desktop in Amazon will be upgraded to version 10.4 as well. The project includes proper unit and integration testing. Cityworks production is anticipated to be upgraded on an annual basis. ArcGIS

software including production server and SDE are anticipated to be upgraded every two years. This project has a dependency on Project 1B.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Production Environment (Cloud)</li> <li>• Upgrade ArcGIS Desktop in Amazon</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$14,000 (includes costs for Projects 1A – 1C)

### Project 1D – Park Furnishings and Irrigation Valve Inventory Update

In this Project, the City will update the inventory related to park furnishing. This includes data such as park furnishings, park structures, waste containers, and ground cover. The Data Inventory Matrix on Page 22 includes a list of these assets. Also included in this project is the update of information that provides a better understanding of park capacity for event planning and answering related calls (e.g. electric outlet availability, water spigots, etc.). As part of this project, the City will also complete the update to the inventory of Irrigation Valves. This will allow Grounds to issue work orders and maintain the assets. It will also help the Sustainability group in their need to track water usage. The City has already completed data models within SDE for irrigation valves inventory update. The project includes using the data models to collect data by Grounds field staff and using the collected data for scheduling inspections and maintenance, as needed. The SDE replication process and associated scripts may be modified as needed to ensure accurate update of the enterprise SDE.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Data creation and collection</li> <li>• QA/QC</li> <li>• Update SDE</li> <li>• Publish services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> <li>• Grounds Staff</li> </ul>

### Project 1E – Cityworks Implementation for Grounds

In this project, the City will implement Cityworks for the Grounds group so they can begin maintaining park furnishing and irrigation assets inventoried and updated as part of Project 1D. This includes delineating workflows, designing workorder templates and custom fields, designing inspection templates and custom fields, static reporting requirements, dashboards, and notification protocols. This Project has a dependency on Project 1D.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Deploy data models and templates in Cityworks</li> <li>• Design workflows</li> <li>• Setup and configure Cityworks dashboards, reports, notifications, etc.</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> <li>• Grounds Staff</li> </ul>
<b>Project Costs</b>	\$7,500

### Project 1F - Building Facility Assets Inventory Update

In this project, the City will update the inventory of assets within city owned facilities (boilers, a/c units, phone binding posts, etc.). This will allow the City to track facility maintenance using Cityworks as well as track upgrades as part of its Climate Action Plan initiative. The project includes designing the data model for Cityworks, adding fields in the GIS for capturing building square footage, year built, etc., publishing services, performing data collection by Facility field crews and using the collected data for scheduling inspections and maintenance, as needed. The SDE replication process and associated scripts may be modified as needed to ensure accurate update of the enterprise SDE.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Data creation and collection</li> <li>• QA/QC</li> <li>• Update SDE</li> <li>• Publish services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> <li>• Facilities staff</li> </ul>

### Project 1G – Cityworks Implementation for Facilities

In this project, the City will implement Cityworks for the Facilities group so they can begin maintaining building assets inventoried as part of Project 1F above. This includes delineating workflows, designing workorder templates and custom fields, designing inspection templates and custom fields, static reporting requirements, dashboards, and notification protocols. This Project has a dependency on Project 1F.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Deploy data models and templates in Cityworks</li> <li>• Design workflows</li> <li>• Setup and configure Cityworks dashboards, reports, notifications, etc.</li> </ul>
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<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> <li>• Grounds Staff</li> </ul>
<b>Project Costs</b>	\$7,500

### Project 1H - Easements Inventory Update

In this project (currently ongoing), the City will continue to update its inventory of easements in the City. The project is intended to help multiple groups look up easement information in the GIS. The City has completed scanning easement drawings. The process includes georeferencing the scanned easement drawings, and updating the easement inventory in the GIS using heads up digitizing tools and techniques. This ongoing project is anticipated to be completed in Phase 2 (Please see Phase 1 and 2 timelines).

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Georeference scanned drawings</li> <li>• Digitize easement data</li> <li>• QA/QC</li> <li>• Load in to SDE</li> <li>• Publish services for viewers</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 1I - Laserfiche Re-Organization and Workflow Setup

In this project, the City will re-organize Laserfiche and establish a standard workflow to scan and load various drawings and documents on a regular basis. This will include working with the various departments and establishing a standard structure for storing scanned documents in various categories. A standard naming convention will be established for easy search, retrieval from other applications, and proper linkage. Appropriate metadata and templates will be established within Laserfiche to help link and find documents. Additionally, this project will identify stewards within the various departments that will be given the responsibility to scan documents related to their group on a regular basis. Notification methods will be setup so that GIS data maintainers know when updated scanned documents are available so they can update GIS information and scanned document linkages. The project results in a document that records the proposed Laserfiche structure, stewardship, and communication protocols. Later projects in the Implementation Plan will use this document as a guide for performing scanning tasks and setting up data update workflows.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Establish standard structure in Laserfiche</li> <li>• Reorganize Laserfiche based on standard structure</li> <li>• Identify stewards for scanning documents</li> <li>• Document structure and stewardship</li> </ul>
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<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Stakeholders</li> <li>• GIS Manager</li> </ul>
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### Project 1J - Esri Application Refresh

In this project (repeated annually), the City will update its Esri template based apps such as Parks Finder, Open Data Portal, etc., to the latest application versions available. This project is based on the City’s intent to regularly refresh their Esri template based apps and incorporate improvements in functionality and experience (see Page 16). The City will also use this project to develop new apps as needed. For example, the City may choose to develop focused apps using Web AppBuilder that help users visualize trends and patterns per recommendations on Page 28.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Configure latest app templates</li> <li>• Migrate data and services, as needed</li> <li>• Test and deploy new apps</li> <li>• Deactivate old apps</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 1K - Waze Two Way Partnership Data Review and Strategy

In this Project, the City will evaluate and review the data obtained from Waze as part of the two-way data sharing agreement the City is working on. It is assumed that the agreement is already in place for this project to occur. Based on the data review, the City will strategize on building solutions that leverage the Waze data. Project 1M below includes implementing Waze data based solutions based on outcome of data review and strategies in this project.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Waze data review</li> <li>• Implementation strategies</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• IT Manager</li> <li>• User Groups</li> </ul>

### Project 1L - Waze Implementation

In this project, the City will leverage Waze data and build solutions that will benefit City maintenance and emergency response workflows. Implementation of Waze data based solutions is contingent on satisfactory review of Waze data as mentioned in Project 1L above. The City anticipates the solutions implemented in this project include scheduling street repairs, responding to unplanned events and adjusting traffic signal timings, based on information provided by real time and historical Waze data. This project will have a dependency on Project 1L.

Anticipated tasks and resources include:



<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Incorporate waze data in workflow for scheduling work in Cityworks</li> <li>• Incorporate waze data into alerting workflow for operations and emergency response</li> <li>• Setup monthly data exports for traffic signal group</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• Waze technical support</li> <li>• IT Manager</li> <li>• User Groups</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 1M – BuildingEye Implementation

In this project, the City will implement a citizen portal BuildingEye (or similar) which will allow the City to share project and permit status, along with related documents with the public. This will allow the public to look up the same information that is available to internal City staff.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Prepare data and/or publish required services<sup>14</sup></li> <li>• Implement BuildingEye</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Consultant / Vendor</li> </ul>
<b>Project Costs</b>	\$ 43,000 (includes Implementation and the first 3 years of maintenance).

### Project 1N – 3D City Model and Planning Application

In this project, the City will leverage its partnership with Esri and build a 3D model of the entire City. This includes development of a 3D application that helps customers visualize how potential construction will affect heights and setbacks and impact municipal code in 3D. The City has purchased new LIDAR and aerial imagery which will be used for this project. The project includes training for City staff in CityEngine and authoring and publishing scenes in ArcGIS Online.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Develop 3D model of City and Planning Application</li> <li>• Publish services</li> <li>• Author maps and scenes</li> <li>• Develop scene viewer</li> </ul>
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<sup>14</sup> Specific requirements to be obtained from BuildingEye



<b>Staffing Resources</b>	• Training
	• GIS Vendor / Consultant
	• GIS Manager
	• GIS Technician
<b>Project Costs</b>	\$ 40,000

### Project 10 – CRM Selection and Implementation

As mentioned earlier, the City is looking to replace Comcate with a new CRM system (see Page 15). In this project, the City will evaluate CRM vendors and select a vendor that will best integrate with Cityworks, SeeClickFix, Citysourced and public facing applications. The City will implement the CRM system of the selected vendor.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	• Evaluate CRM system
	• Implement CRM system
<b>Staffing Resources</b>	• Vendor / Consultant
	• GIS Manager

### Project 1P – Cityworks and CRM Integration

In this project, the City will integrate Cityworks with the new CRM system implemented in Project 1P above. The integration includes designing and implementing Cityworks service request templates. This project has a dependency on Project 1P.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	• Design Cityworks service request templates
	• Test and deploy in Cityworks
<b>Staffing Resources</b>	• Vendor / Consultant
	• GIS Manager
	• Asset Management Technician
<b>Project Costs</b>	\$ 5,000

### Project 1Q – Cityworks and Fuel Management System Integration

In this project, the City will configure the fuel management system to feed information to Cityworks. Depending on available functionality and requirements, this integration may include using services (e.g. REST, GeoJSON, etc.), or establishing a workflow where data is exported from one system, manipulated and imported to the other system on a set schedule. Cityworks will be used to schedule preventative maintenance on fleet vehicles while the fuel management system will be used to track fuel consumption. This project will include establishing workflows to report maintenance and fuel usage in support of the City’s climate action plan initiatives.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Determine integration requirements</li> <li>• Configuration (services and/or workflows)</li> <li>• Testing</li> <li>• Go Live</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• Vendor / GIS Consultant</li> <li>• IT Manager</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 1R – PerfectMind Software and GIS Integration

In this project, the City will integrate the GIS and the PerfectMind systems. Depending on available functionality and requirements, this integration may include using services (e.g. REST, GeoJSON, etc.), or establishing a workflow where data is exported from one system, manipulated and imported to the other system on a set schedule.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Determine integration requirements</li> <li>• Configuration (services and/or workflows)</li> <li>• Testing</li> <li>• Go Live</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• Vendor</li> <li>• IT Manager</li> </ul>

### Training 1A

In this Training, the City will conduct training sessions on various topics for Cityworks users and Magnet users. The training sessions will introduce staff to training videos for Cityworks and Magnet respectively. Based on the need, these sessions may include hands on training that will cover modules, tools and workflows with training materials provided. The City will also use this opportunity to introduce new or updated apps staff can use internally or for sharing information with the public. This Training includes sessions for the above topics conducted over a week’s duration, and will be repeated on an annual basis to ensure continuous training support.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and videos preparation</li> <li>• Conduct training sessions</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Phase 1 Timeline

FY 2016-17

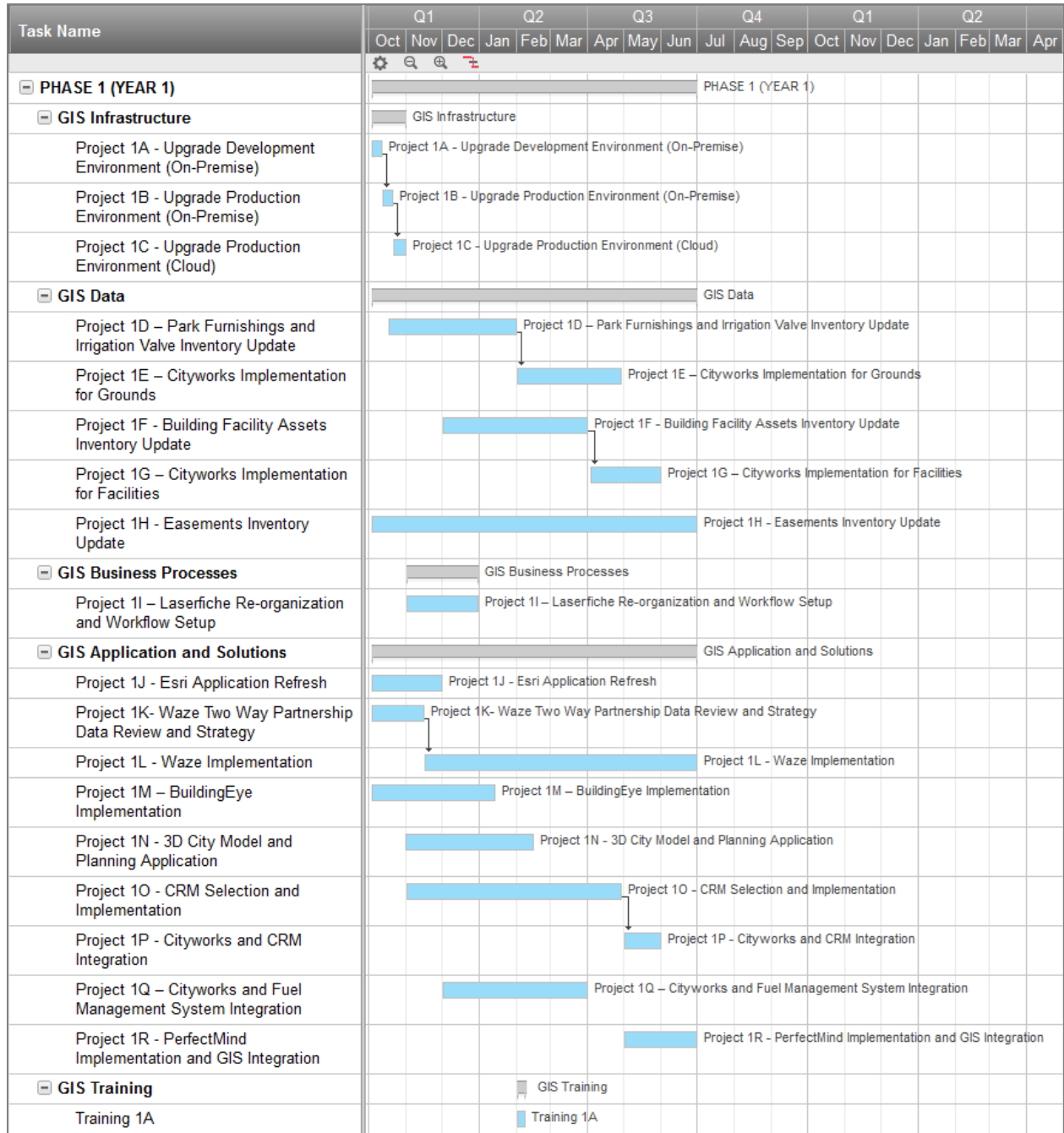


Figure 8: Phase 1 Timeline

## Phase 2 (Year 2)

This includes projects for FY 2017-18

### Project 2A - Upgrade Development Environment (On-Premise)

In this project, the City will perform the annual upgrade of the development environment. This includes the upgrade of the Cityworks development version.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Development Environment</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 2B - Upgrade Production Environment (Cloud)

In this project, the City will perform the annual upgrade of Cityworks production in the Amazon cloud. This project has a dependency on Project 2A.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Production Environment (Cloud)</li> <li>• Upgrade ArcGIS Desktop in Amazon</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 2C - Traffic Sign Inventory Update

In this project, the City will update the inventory related to traffic signs, sign supports, legends and related data. The Data Inventory Matrix on Page 22 includes a list of these assets. The City expects to hire interns who will perform the data collection.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Hire and Train Interns</li> <li>• Data Collection by Interns</li> <li>• QA/QC</li> <li>• Update SDE</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> <li>• Interns (x2)</li> </ul>
<b>Project Costs</b>	\$ 40,000.00

### Project 2D – Water Infrastructure Inventory Update

In this Project, the City will update the inventory related to underground water infrastructure such as water mains and laterals. This data will be obtained from water agencies such as SJWC, CalWater and the Service District. The City will use this data to compare their inventory of water meters and update the data as needed. The project includes establishing a workflow to update the GIS with yearly updates from the water agencies.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Obtain data from water agencies</li> <li>• QA/QC</li> <li>• Load in to SDE</li> <li>• Publish services</li> <li>• Establish workflow for yearly data updates</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 2E - Tree Inventory Update

In this project, the City will conduct a tree inventory audit of all City owned trees. The City will then update its tree inventory based on the audit. This project will help support maintenance operations as well as climate action plan initiatives. The project includes incorporating private development trees data from the Planning department and creek trees from Recreation and Community Services, into the tree inventory. The updated data will be published as map services and made available to other groups using Magnet and other applications. The project will ensure that the tree inventory schema will include fields that will allow users to query trees and understand which new trees were added (e.g. query by date).

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Audit city owned trees</li> <li>• Incorporate data from other departments</li> <li>• Update layer</li> <li>• QA/QC</li> <li>• Load in to SDE</li> <li>• Publish services and configure GIS viewer(s)</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 2F – Sewer Infrastructure Inventory Update

In this Project, the City will update the inventory related to underground sewer infrastructure such as sewer mains and laterals. This data will be obtained from sanitary agencies such as Cupertino and Sunnyvale Sanitary Districts. The project includes establishing a workflow to update the GIS with yearly updates from the sanitary districts.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Obtain data from sanitary agencies</li> <li>• QA/QC</li> <li>• Load in to SDE</li> <li>• Publish services</li> <li>• Establish workflow for yearly data updates</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 2G - Gray Pipe Property Inventory Update

In this project, the City will create a feature class of gray pipe properties in the City. The project includes designing the schema, populating the layer and publishing services to be made available to Magnet and other systems.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Design schema</li> <li>Populate layer</li> <li>QA/QC</li> <li>Load in to SDE</li> <li>Publish services and configure GIS viewer(s)</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Manager</li> <li>GIS Technician</li> </ul>

### Project 2H – Scan Project Documents (CIP, non-CIP)

In this project, the City will scan project documents related to CIP and non-CIP projects. This will help the City address the need to better track existing and previous improvements at a location or facility. These include improvement plans, as-builts, construction drawings, and so on. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates. This ongoing project is anticipated to be completed in Phase 2 (Please see Phase 1 and 2 timelines for project duration).

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Scan documents per structure for project documents</li> <li>Send notifications to designated staff</li> <li>Update GIS data and/or links to documents</li> <li>Publish or update services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>Assigned steward(s)</li> <li>GIS Manager</li> </ul>

### Project 2I - Update Records of Survey Collection in Laserfiche

In this project, the City will load Records of Survey documents in PDF format from the County, into Laserfiche. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates. The project includes creating a GIS layer of Records of Survey project polygons and linking these features to the documents in Laserfiche.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Load pdf documents from County per</li> </ul>
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<b>Staffing Resources</b>	structure for project documents <ul style="list-style-type: none"> <li>• Send notifications to designated staff</li> <li>• Create GIS data and link to documents in Laserfiche</li> <li>• Publish or update services</li> </ul>
	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• Assigned Steward(s)</li> </ul>

**Project 2J - Scan Historical Building Permits**

In this project, the City will continue to scan its historical building permits in to Laserfiche, and setup links between GIS and scanned documents in Laserfiche. This will allow multiple groups retrieve this information from map viewers. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Scan documents per structure for project documents</li> <li>• Send notifications to designated staff</li> <li>• Update GIS data and/or links to documents</li> <li>• Publish or update services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Assigned steward(s)</li> <li>• GIS Manager</li> </ul>

**Project 2K - Scan Historical Traffic Surveys**

In this project, the City will scan its historical traffic surveys in to Laserfiche. This will allow multiple groups retrieve this information from map viewers. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Scan documents per structure for project documents</li> <li>• Send notifications to designated staff</li> <li>• Update GIS data and/or links to documents</li> <li>• Publish or update services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Assigned steward(s)</li> <li>• GIS Manager</li> </ul>

**Project 2L - Scan Traffic Intersection Plans**

In this project, the City will scan its Traffic Intersection Plans in to Laserfiche, and setup links between GIS and scanned documents in Laserfiche. This will allow multiple groups to retrieve this information

from Magnet and also the Cityworks. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Scan documents per structure for project documents</li> <li>• Send notifications to designated staff</li> <li>• Update GIS data and/or links to documents</li> <li>• Publish or update services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Assigned steward(s)</li> <li>• GIS Manager</li> </ul>

### **Project 2M - CIP Project Update Workflow**

In this project, the City will share a web map with editable feature services with project managers in the CIP group. The project managers will use this web map to edit information that is displayed in the public CIP viewer<sup>15</sup>. The project features in the web map can include linkages that will allow the public to retrieve project drawings scanned in to Laserfiche as part of Project 2H. This will streamline the process of providing project updates to the public.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Publish feature services</li> <li>• Author and share web maps for CIP PM's</li> <li>• Training</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### **Project 2N – Esri Application Refresh**

This project includes the annual refresh of the City’s Esri template based apps to the latest application versions available.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Configure latest app templates</li> <li>• Migrate data and services, as needed</li> <li>• Test and deploy new apps</li> <li>• Deactivate old apps</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

<sup>15</sup> <http://gis.cupertino.org/cip/>



### Project 2O - City Website GIS Enhancements and Public Viewer

In this project, the City will ensure that GIS is well integrated with the City’s website. This will include embedding existing or new maps and apps at strategic locations in the new website. A part of this project includes implementing a public facing viewer, as part of the City’s work plan for the current fiscal year. This viewer will display City services and can be accessed right from the homepage of the City website. The City is working with Esri on implementing the public facing viewer.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Determine integration requirements</li> <li>Configuration (services and/or workflows)</li> <li>Testing</li> <li>Go Live</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Manager</li> <li>Vendor / GIS Consultant</li> <li>IT Manager</li> </ul>
<b>Project Costs</b>	\$ 10,000

### Project 2P - GIS and Financial Software Integration

In this project, the City will configure the City’s financial software to consume services from the Enterprise GIS. Depending on available functionality and requirements, this integration may include using services (e.g. REST, GeoJSON, etc.), or establishing a workflow where data is exported from one system, manipulated and imported to the other system on a set schedule. This project has a dependency on Project 1F. The GIS assets inventoried in Project 1F will be linked with the financial software to help track changes.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Determine integration requirements</li> <li>Configuration (services and/or workflows)</li> <li>Testing</li> <li>Go Live</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Manager</li> <li>Vendor / GIS Consultant</li> <li>IT Manager</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 2Q - GIS and Lucid Integration

In this project, the City will configure Lucid to consume services from the Enterprise GIS. The Lucid platform allows management and tracking of energy usage within a portfolio of buildings. Depending on available functionality and requirements, this integration may include using services (e.g. REST, GeoJSON, etc.), or establishing a workflow where data is exported from one system, manipulated and imported to the other system on a set schedule. It is assumed that the City will complete purchase and implementation of the Lucid system prior to the start of this project. Note that this project may be

completed as part of the Lucid system installation process itself and the actual schedule may vary based on the installation timeline of that system.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Determine integration requirements</li> <li>• Configuration (services and/or workflows)</li> <li>• Testing</li> <li>• Go Live</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• Vendor / GIS Consultant</li> <li>• IT Manager</li> </ul>

### Training 2A

This includes the annual training (see Training 1A) that the City will undertake to provide continuous support for Cityworks, Magnet and Esri application users.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and videos preparation</li> <li>• Conduct training sessions</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Training 2B – ArcGIS Pro Training

In this training, the City will conduct two days of training on ArcGIS Pro. This will allow the City to transition to the latest desktop mapping tools and also use the 3D functionality of ArcGIS Pro to build on the work done during Project 10.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and demos preparation</li> <li>• Training</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> </ul>

### Phase 2 Timeline

FY 2017-18

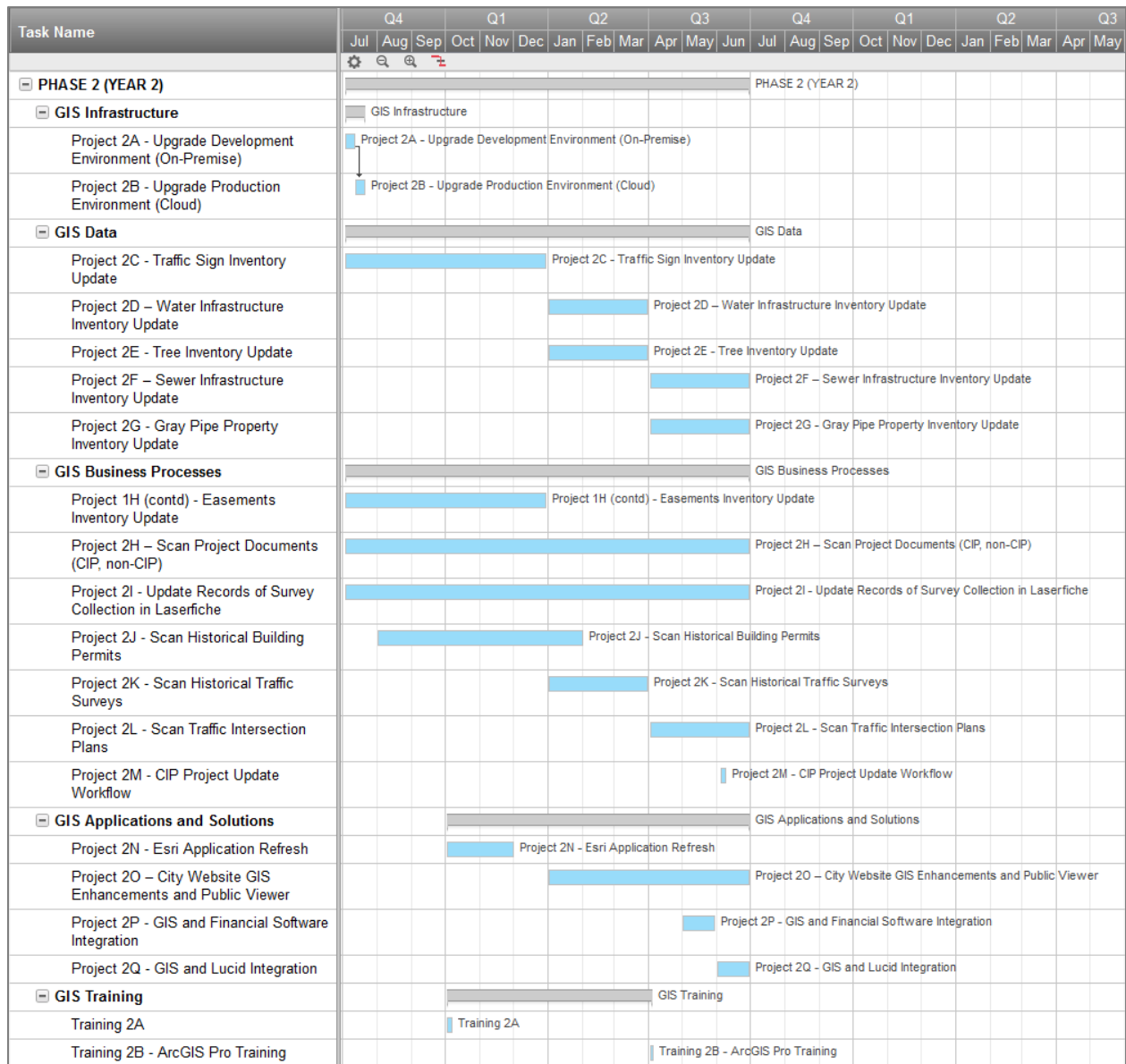


Figure 9: Phase 2 Timeline

### Phase 3 (Year 3)

This includes projects for FY 2018-19

#### Project 3A - Upgrade Development Environment (On-Premise)

In this project, the City will perform the annual upgrade of the development environment to the latest software versions of Cityworks, ArcGIS Server and SDE.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Upgrade Development Environment</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Consultant</li> </ul>

<b>Project Costs</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
	\$5,000

### Project 3B - Upgrade Production Environment (On-Premise)

In this project, the City will upgrade the on-premise Production environment to the latest version. ArcGIS Desktops will be upgraded as well. The project includes proper unit and integration testing. This project has a dependency on Project 3A.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade on-premise Production Environment</li> <li>• Upgrade ArcGIS Desktops</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 3C - Upgrade Production Environment (Cloud)

In this project, the City will upgrade the Production Environment in the Amazon cloud. The City may also implement Geoevent Processor Extension and Image Extension as noted in the GIS Architecture Additions section on Page 18. This project has a dependency on Project 3B.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Production Environment (Cloud)</li> <li>• Upgrade ArcGIS Desktop in Amazon</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000 (additional \$10,000 each for GeoEvent Processor and Image Extension)

### Project 3D - History of Storm Drain Violations

In this project, the City will create a feature class for maintaining a history of locations of storm violations in the City. The project includes designing the schema, populating the layer and publishing GIS services. The feature class will be designed to track date of violation and severity. Date fields will be used for visualization of changes over time, which can help uncover trends and patterns. The project will include creation of a web map that will allow designated staff to edit violation information, and begin using GIS instead of maintaining the information in a spreadsheet.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Create feature class schema</li> <li>• Convert data from spreadsheet and</li> </ul>
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<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>populate feature class</li> <li>• Publish services and author web map for editing</li> <li>• Deploy web app for visualization and trends analysis</li> <li>• Training</li> </ul>
	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 3E - Historical Traffic Surveys

In this project, the City will create a feature class for maintaining historical traffic survey and count data. Similar to Project 3D above, this project includes designing the schema, populating the layer and publishing GIS services. Date fields will be used for visualization of changes over time which can help uncover trends and patterns. This project has a dependency on Project 2K. Scanned historical traffic survey documents from Project 2K will be linked to features in the newly created feature class.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Create feature class schema</li> <li>• Convert data from paper files and populate feature class</li> <li>• Publish services and author web map</li> <li>• Link features to Laserfiche documents from Project 2K</li> <li>• Deploy web app for visualization and trends analysis</li> <li>• Training</li> </ul>
	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 3F - Trash Enclosure Inventory

In this project, the City will convert spreadsheets with trash enclosure (private and public dumpster) information in to GIS. This includes designing a feature class schema, populating the layer and publishing GIS services.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Create feature class schema</li> <li>• Convert data from spreadsheet and populate feature class</li> <li>• Publish services and configure GIS viewer(s)</li> </ul>
	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 3G - Pervious and Hardscaped Areas

In this project, the City will use LIDAR data and develop a feature class to store locations of pervious and hardscaped areas and associated information. This includes designing a feature class schema, populating the layer and publishing GIS services.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Create feature class schema</li> <li>• Populate feature class</li> <li>• QA/QC</li> <li>• Publish services and configure GIS viewer(s)</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Consultant</li> </ul>
<b>Project Costs</b>	\$ 5,000

### Project 3H - PG&E Data

In this Project, the City will update the GIS with data from PG&E. This includes electric meters, PG&E boxes, and underground gas infrastructure assets. The project includes establishing a data sharing agreement and an internal maintenance workflow to update the GIS with yearly updates from PG&E. The project also includes field verification of PG&E meters.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Create feature class schemas</li> <li>• Populate feature classes</li> <li>• Field verification</li> <li>• Publish services and configure GIS viewer(s)</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> <li>• Field crew</li> </ul>

### Project 3I - Scan Park Improvement Drawings

In this project, the City will scan park improvement drawings in to Laserfiche. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Scan documents per structure for project documents</li> <li>• Send notifications to designated staff</li> <li>• Update GIS data and/or links to documents</li> <li>• Publish or update services</li> </ul>
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<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>Assigned steward(s)</li> <li>GIS Manager</li> </ul>
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### Project 3J - Publish Historic Aerial Image Services

In this project, the City will use the Image Extension implemented in Project 3C, and publish image services of its historical aerial imagery. Mosaic Datasets of raw imagery will be created as part of this process. The image services can be used in various web applications to help staff during workflows that involve visualizing changes over time.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Configure Mosaic Datasets</li> <li>Configure and publish image services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Manager</li> <li>GIS Technician</li> </ul>

### Project 3K - Capability Maturity Model Assessment

In this project, the City will perform the first of two assessments of the maturity of its Enterprise GIS, during the Implementation Plan timeframe. The City will use URISA’s Capability Maturity Model<sup>16</sup> template as a guide to perform the assessment. This will allow the City to assess its effectiveness in GIS service delivery. This will also help the City make adjustments if needed to ensure the City’s Enterprise GIS is able to deliver its stated goals. The Capability Maturity Model is a numeric rating system that provides a high level analysis of the GIS system.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Conduct interviews with GIS users</li> <li>Perform assessments and give ratings per CMM template</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Manager</li> </ul>

### Project 3L – Strategic Plan Review and Revise

In this project, the City will conduct the first of two reviews of the Strategic Plan, which are scheduled to occur within the Implementation Plan timeframe. This project has a dependency on Project 3J. The City will use the CMM rating from Project 3J to also inform the review of the Strategic Plan. If adjustments need to be made, the City will revise the plan accordingly to ensure the City is able to meet its goals and objectives for the GIS System. The City may hire a GIS Consultant to perform the review and revision.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Performance Review</li> <li>Strategic Plan Revisions</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Consultant</li> </ul>

<sup>16</sup> <http://www.urisa.org/clientuploads/directory/GMI/GIS-CMM-Final201309%28Endorsed%20for%20Publication%29.pdf>

	<ul style="list-style-type: none"> <li>• GIS Manager</li> </ul>
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### Project 3M – Esri Application Refresh

This project includes the annual refresh of the City’s Esri template based apps to the latest application versions available.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Configure latest app templates</li> <li>• Migrate data and services, as needed</li> <li>• Test and deploy new apps</li> <li>• Deactivate old apps</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 3N – Insights for ArcGIS Implementation

In this project, the City will use the Insights for ArcGIS product to analyze current and historical trends and patterns in the City’s GIS data. The City will begin with a selected dataset (e.g. traffic counts) and produce analytical products that can be shared via a Portal as maps, apps and operations dashboards to users and decision makers. The City will use this project to introduce analytics based decision making within a business units workflows (e.g. traffic), that can later be expanded to other business units. The City may be able to leverage streaming data via GeoEvent Processor and perform real-time analysis with Insights for ArcGIS<sup>17</sup>. Table 4 in Section 3 provides some guidance on how the City can use various charts and graphs when analyzing data. The Insights for ArcGIS product can be used to produce such charts and graphs to gain better insights from the City’s data. The City may also discover more needs related to applying analytics within business processes after performing the first CMM assessment and Strategic Plan revisions during Projects 3J and 3K respectively.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Implement Insights for ArcGIS</li> <li>• Publish maps, apps and dashboards</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 3O - Story Maps for Parks and Community Services

In this project, the City will create story map applications that it will use to attract participation in nature events and other park activities, and also showcase existing events.

Anticipated tasks and resources include:

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<sup>17</sup> As of the writing of this report, Insights for ArcGIS requires Portal for ArcGIS and does not support analyzing streaming data from GeoEvent Processor. However, based on Esri’s roadmap, it is anticipated that Insights for ArcGIS will work with content from ArcGIS Online and support streaming data from GeoEvent Processor by the time this project begins.



<b>Tasks</b>	<ul style="list-style-type: none"> <li>Publish services</li> <li>Author web maps</li> <li>Configure story map applications</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Manager</li> <li>GIS Technician</li> </ul>

### Project 3P - Story Maps for Human Resources

In this project, the City will create story map applications that it will use to showcase the City and its facilities to potential new employees, and as part of orientation and recruitment activities. The story map applications will also be used to provide information on projects the City is currently working that would be of interest to potential hires or new employees.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Publish services</li> <li>Author web maps</li> <li>Configure story map applications</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Manager</li> <li>GIS Technician</li> </ul>

### Project 3Q - GIS and Permitting System Integration

In this project, the City will configure the new permitting system to consume services from the Enterprise GIS. Depending on available functionality and requirements, this integration may include using services (e.g. REST, GeoJSON, etc.), or establishing a workflow where data is exported from one system, manipulated and imported to the other system on a set schedule. It is assumed that the City will complete evaluation, purchase and implementation of the new permitting system prior to the start of this project. Note that this project may be completed as part of the permitting system installation process itself, and the actual schedule may vary based on the installation timeline of that system.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>Determine integration requirements</li> <li>Configuration (services and/or workflows)</li> <li>Testing</li> <li>Cut over from Magnet and Go Live</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>GIS Vendor / Consultant</li> <li>GIS Manager</li> <li>GIS Technician</li> </ul>
<b>Project Costs</b>	\$ 3,000 (GIS Integration only. Software and Implementation costs are not included)

### Project 3R – Waze and ArcGIS Technology Integration

In this project, the City will expand its implementation of Waze from Project 1L, by leveraging ArcGIS technology. The City will use ArcGIS Server, ArcGIS Online and GeoEvent processor (implemented

during Project 3C), and a Spatiotemporal BigData store<sup>18</sup>. Real time data from Waze is consumed in GeoJSON format. The GeoEvent Processor is used to filter the data for departments such as Traffic, Streets, and Public Safety partner agencies. Filtered data is stored in the spatiotemporal big data store. Based on criteria established by the City, the GeoEvent processor sends alerts to designated staff when events such as traffic accidents, congestions, occur or repairs are noted by Waze users<sup>19</sup>.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Implement GeoEvent Processor</li> <li>• Implement Spatiotemporal BigData Store</li> <li>• Establish filters and alerting criteria for GeoEvent Processor</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> </ul>

### Training 3A

This includes the annual training (see Training 1A) that the City will undertake to provide continuous support for Cityworks, Magnet and Esri application users.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and videos preparation</li> <li>• Conduct training sessions</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Training 3B –GeoEvent Processor and Insights for ArcGIS Training

In this training, the City will conduct a two-day training session on GeoEvent Processor, and Insights for ArcGIS for City staff. Topics will include:

- Introduction to GeoEvent Processor
- Configuring GeoEvent Processor
- Introduction to Insights for ArcGIS
- Performing analysis
- Sharing results and information products

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and demos preparation</li> </ul>
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<sup>18</sup> This project assumes ArcGIS Online will support a spatiotemporal data store by the time this project begins in Year 3. If not, the City will need to implement an on-premise Portal to realize this project. Implementing an on-premise portal will necessitate purchasing additional ArcGIS Server licenses. The City may consider purchasing an Esri ELA at this point.

<sup>19</sup> Based on a case study and presentation by Johns Creek, GA at the 2016 Esri International User Conference. [http://proceedings.esri.com/library/userconf/proc16/papers/64\\_313.pdf](http://proceedings.esri.com/library/userconf/proc16/papers/64_313.pdf)

<b>Staffing Resources</b>	• Training
	• GIS Consultant
	• GIS Manager

**Phase 3 Timeline**  
FY 2018-19

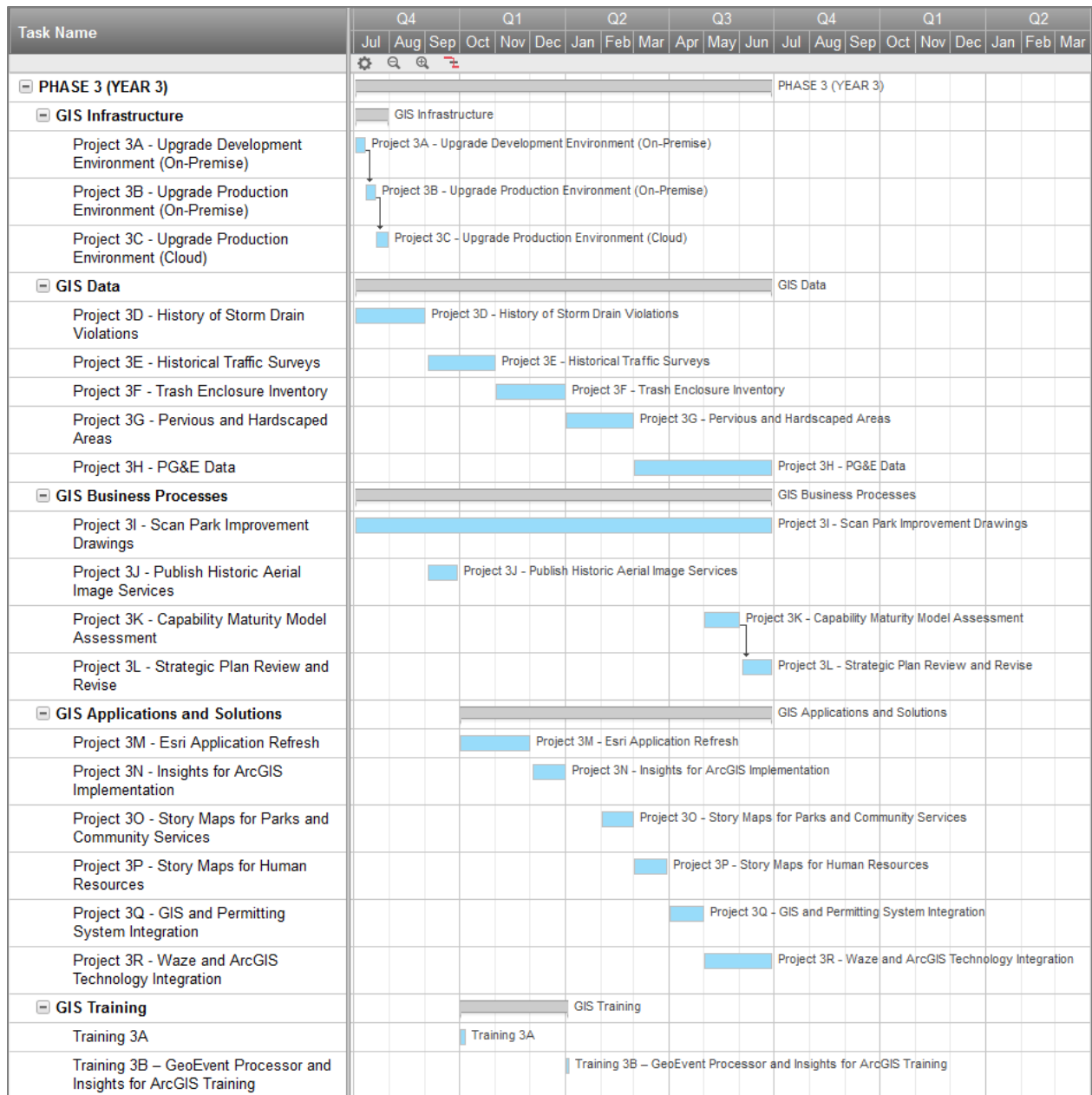


Figure 10: Phase 3 Timeline

## Phase 4 (Year 4)

This includes projects for FY 2019-20

### Project 4A - Upgrade Development Environment (On-Premise)

In this project, the City will perform the annual upgrade of the development environment. This includes the upgrade of the Cityworks development version.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Development Environment</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 4B - Upgrade Production Environment (Cloud)

In this project, the City will perform the annual upgrade of Cityworks production in the Amazon cloud. This project has a dependency on Project 4A.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Production Environment (Cloud)</li> <li>• Upgrade ArcGIS Desktop in Amazon</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 4C - Historical Code Violations

In this project, the City will create a feature class for maintaining a history of locations of code violations in the City. The project includes designing the schema, populating the layer and publishing GIS services. The feature class will be designed to track dates and types of violation. Date fields will be used for visualization of changes over time which can help uncover trends and patterns.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Create feature class schema</li> <li>• Populate feature class</li> <li>• Publish services and author web map</li> <li>• Deploy web app for visualization and trends analysis</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Training</li> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 4D - Well and Water Rights Inventory Update

In this project, the City will update its inventory of well and water rights in the City. This information will be obtained from the CIP group. The process includes designing a feature class schema, populating the layer and publishing GIS services.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Create feature class schema</li> <li>• Publish services and configure GIS viewer(s)</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 4E – Scan Bridge Drawings

In this Project, the City will scan drawings related to bridge improvements and construction in to Laserfiche. The scanned drawings will be linked to bridge features. Bridge data will be updated to include any changes and will be published as a service to be consumed by Cityworks for tracking maintenance. Date fields will be added to allow for tracking history. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Scan documents per structure for project documents</li> <li>• Send notifications to designated staff</li> <li>• Update GIS data and/or links to documents</li> <li>• Publish or update services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Assigned steward(s)</li> <li>• GIS Manager</li> </ul>

### Project 4F - Scan Plant Lists and Renovation Drawing Plans

In this project, the City will scan in to Laserfiche Plant Lists and Renovation Drawing Plans that are needed by the Trees/ROW group. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates. This will provide staff access to the median plant list and drawings used during a median’s previous renovation through Cityworks.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Scan documents per structure for project documents</li> <li>• Send notifications to designated staff</li> <li>• Update GIS data and/or links to documents</li> </ul>
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<b>Staffing Resources</b>	• Publish or update services
	• Assigned steward(s)
	• GIS Manager

### Project 4G – Esri Application Refresh

This project includes the annual refresh of the City’s Esri template based apps to the latest application versions available.

Anticipated tasks and resources include:

<b>Tasks</b>	• Configure latest app templates
	• Migrate data and services, as needed
	• Test and deploy new apps
	• Deactivate old apps
<b>Staffing Resources</b>	• GIS Manager
	• GIS Technician

### Project 4H – 3D Apps

In this project, the City will leverage 3D buildings built during Project 1O and build 3D applications that support City climate action plan and planning workflows. These include a 3D application that will allow the City to determine solar generation potential for buildings that may lead to energy saving measures as part of the climate action plan initiatives<sup>20</sup>. Another application is a Zoning regulation visualization app that might help the City identify zoning violations, height studies or analyze development potential within the context of the built environment<sup>21</sup>.

Anticipated tasks and resources include:

<b>Tasks</b>	• Deploy 3D cities templates
	• Gather solar data and 3D data
	• Perform analysis
	• Publish services
	• Deploy app
<b>Staffing Resources</b>	• GIS Manager
	• GIS Technician
	• GIS Consultant
<b>Project Costs</b>	\$10,000

### Project 4I – Cityworks Workflow Planning

In this project, the City will develop a strategy to streamline how various groups use Cityworks. The City will explore ways to reorganize the order of work done by various groups during a project by chaining schedules and examine any cost and time benefits realized. The City will conduct a pilot project where the Trees group will complete maintenance tasks earlier in the project that will trigger notifications for other groups to perform tasks, based on a planned schedule.

<sup>20</sup> <http://desktop.arcgis.com/en/3d/3d-cities/solar-analysis/introduction-to-solar-analysis.htm>

<sup>21</sup> <http://desktop.arcgis.com/en/3d/3d-cities/>

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Develop plan, strategy and schedule</li> <li>• Organize pilot project</li> <li>• Evaluate results and benefits</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> </ul>

### Training 4A

This includes the annual training (see Training 1A) that the City will undertake to provide continuous support for Cityworks, Magnet and Esri application users.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and videos preparation</li> <li>• Conduct training sessions</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Training 4B – ArcGIS Pro Training

In this training, the City will conduct two days of training on ArcGIS Pro. The training will cover 3D functionality which will support City staff when building 3D apps proposed in Project 4H.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and demos preparation</li> <li>• Training</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> </ul>

### Phase 4 Timeline

FY 2019-20

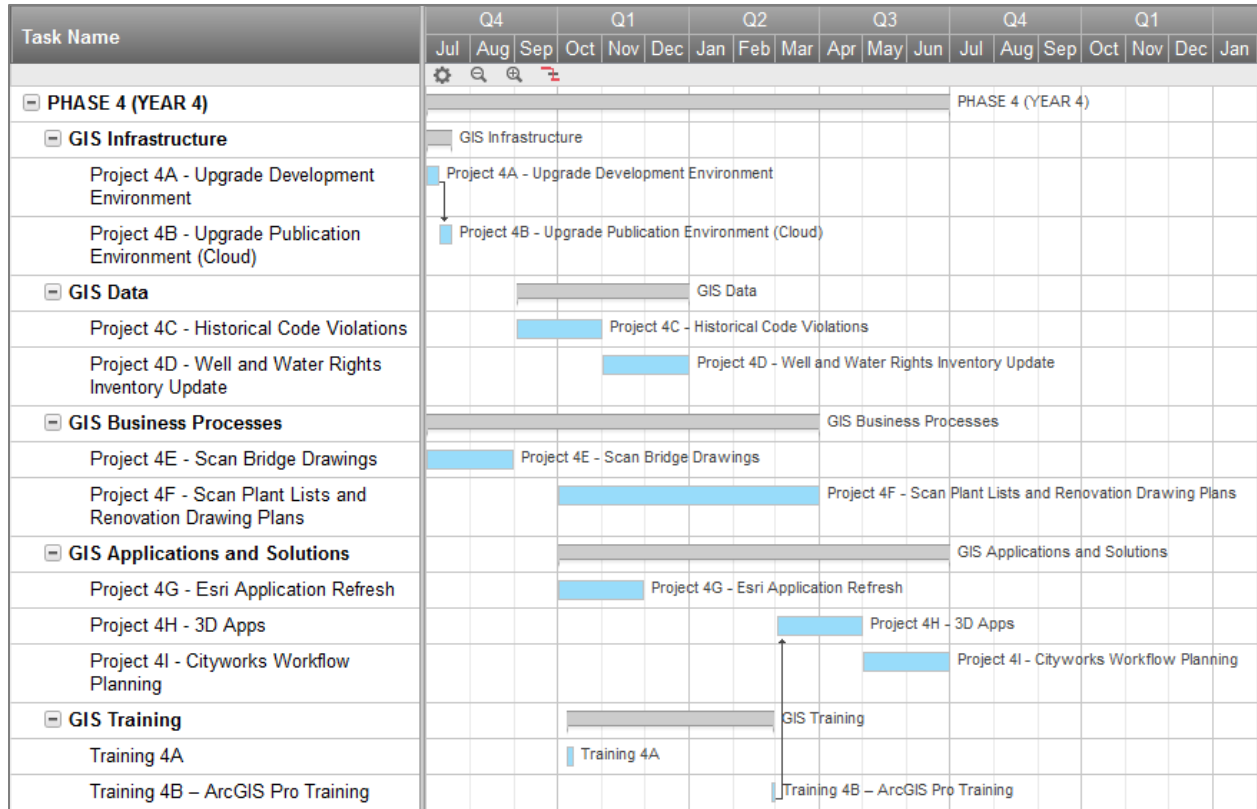


Figure 11: Phase 4 Timeline

## Phase 5 (Year 5)

This includes projects for FY 2020-21

### Project 5A - Upgrade Development Environment (On-Premise)

In this project, the City will perform the annual upgrade of the development environment to the latest software versions of Cityworks, ArcGIS Server and SDE.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Development Environment</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 5B - Upgrade Production Environment (On-Premise)

In this project, the City will upgrade the on-premise Production environment to the latest version. ArcGIS Desktops will be upgraded as well. The project includes proper unit and integration testing. This project has a dependency on Project 5A.

Anticipated tasks, resources and costs include:



<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade on-premise Production Environment</li> <li>• Upgrade ArcGIS Desktops</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 5C - Upgrade Production Environment (Cloud)

In this project, the City will upgrade the Production environment in the Amazon cloud. This project has a dependency on Project 5B. Note that if the City chooses to expand the on-premise architecture per Project 5B, the cloud architecture is anticipated to remain the same. Only software versions will be upgraded.

Anticipated tasks, resources and costs include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Upgrade Production Environment (Cloud)</li> <li>• Upgrade ArcGIS Desktop in Amazon</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> <li>• IT Administrator</li> </ul>
<b>Project Costs</b>	\$5,000

### Project 5D – Telecom Vaults Inventory Update

In this project, the City will create a feature class of telecom vaults in the City. The project includes designing the schema, populating the layer and publishing services. This data will be obtained from telecom companies such as AT&T and Verizon. The project includes establishing a workflow to update the GIS with yearly updates from telecom agencies.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Design schema</li> <li>• Populate layer</li> <li>• QA/QC</li> <li>• Load in to SDE</li> <li>• Publish services and configure GIS viewer(s)</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 5E – Census Data

In this project, the City will evaluate and purchase demographics products from providers such as Nielsen Demographics<sup>22</sup>, Cubit Planning<sup>23</sup>, etc. This will help groups such as Recreation and Community

<sup>22</sup> <http://www.nielsen.com/us/en/solutions/segmentation.html>

<sup>23</sup> <https://www.cubitplanning.com/>

Services understand demographics of event attendees. Economic Development can use this data to understand segmentation in the population and make recommendations to businesses for site selection.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Evaluate and purchase demographics product</li> <li>• Implementation</li> <li>• Testing</li> <li>• Go Live</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• Vendor</li> </ul>

### **Project 5F - Scan Facility Drawings**

In this project, the City will scan facility drawings (e.g. mechanical plans) in to Laserfiche. The City will use the project document generated in Project 1I, to determine Laserfiche structure, stewards for scanning, notification methods, and scanning schedule for future updates.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Scan documents per structure for project documents</li> <li>• Send notifications to designated staff</li> <li>• Update GIS data and/or links to documents</li> <li>• Publish or update services</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Assigned steward(s)</li> <li>• GIS Manager</li> </ul>

### **Project 5G - Capability Maturity Model Assessment**

In this project, the City will perform the second assessment of the maturity of its Enterprise GIS, within the Implementation Plan timeframe. Similar to Project 3J, the assessment will be based on URISA’s Capability Maturity Model template. The City will evaluate performance and changes from the first evaluation in Project 3J. The City will make any adjustments if needed to ensure the City’s Enterprise GIS is able to deliver its stated goals.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Conduct interviews with GIS users</li> <li>• Perform assessments and give ratings per CMM template</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> </ul>

### **Project 5H – Strategic Plan Review and Revise**

In this project, the City will conduct the second review of the Strategic Plan, scheduled to occur within the Implementation Plan timeframe. This project has a dependency on Project 5G. The City will use the

CMM rating from Project 5G to also inform the review of the Strategic Plan. If adjustments need to be made, the City will revise the plan accordingly to ensure the City is able to meet its goals and objectives for the GIS System. The City may hire a GIS Consultant to perform the review and revision.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Performance Review</li> <li>• Strategic Plan Revisions</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Consultant</li> <li>• GIS Manager</li> </ul>

### Project 5I – Esri Application Refresh

This project includes the annual refresh of the City’s Esri template based apps to the latest application versions available.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Configure latest app templates</li> <li>• Migrate data and services, as needed</li> <li>• Test and deploy new apps</li> <li>• Deactivate old apps</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

### Project 5J – WebEOC and GIS Integration

In this project, the City will integrate the Enterprise GIS with WebEOC, by implementing the ArcGIS Extension for WebEOC. This will allow the City to enhance their information sharing, decision support, and situational awareness capabilities during an emergency. It is assumed the City has purchased and implemented WebEOC prior to the beginning of this project.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Publish Services</li> <li>• Configure ArcGIS Online web maps, apps and dashboards</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• GIS Manager</li> <li>• Vendor / GIS Consultant</li> </ul>
<b>Project Costs</b>	\$10,000

### Project 5K – Cityworks Implementation for Emergency Preparedness

In this project, the City will design templates within Cityworks to be used in case of emergency. This will be part of the City’s emergency preparedness efforts where the City will use Cityworks to schedule maintenance work as part of emergency response activities.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Deploy data models and templates in Cityworks</li> <li>• Design workflows</li> <li>• Setup and configure Cityworks dashboards, reports, notifications, etc.</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

**Training 5A**

This includes the annual training (see Training 1A) that the City will undertake to provide continuous support for Cityworks, Magnet and Esri application users.

Anticipated tasks and resources include:

<b>Tasks</b>	<ul style="list-style-type: none"> <li>• Training material and videos preparation</li> <li>• Conduct training sessions</li> </ul>
<b>Staffing Resources</b>	<ul style="list-style-type: none"> <li>• Asset Management Technician</li> <li>• GIS Manager</li> <li>• GIS Technician</li> </ul>

**Phase 5 Timeline**

FY 2020-21

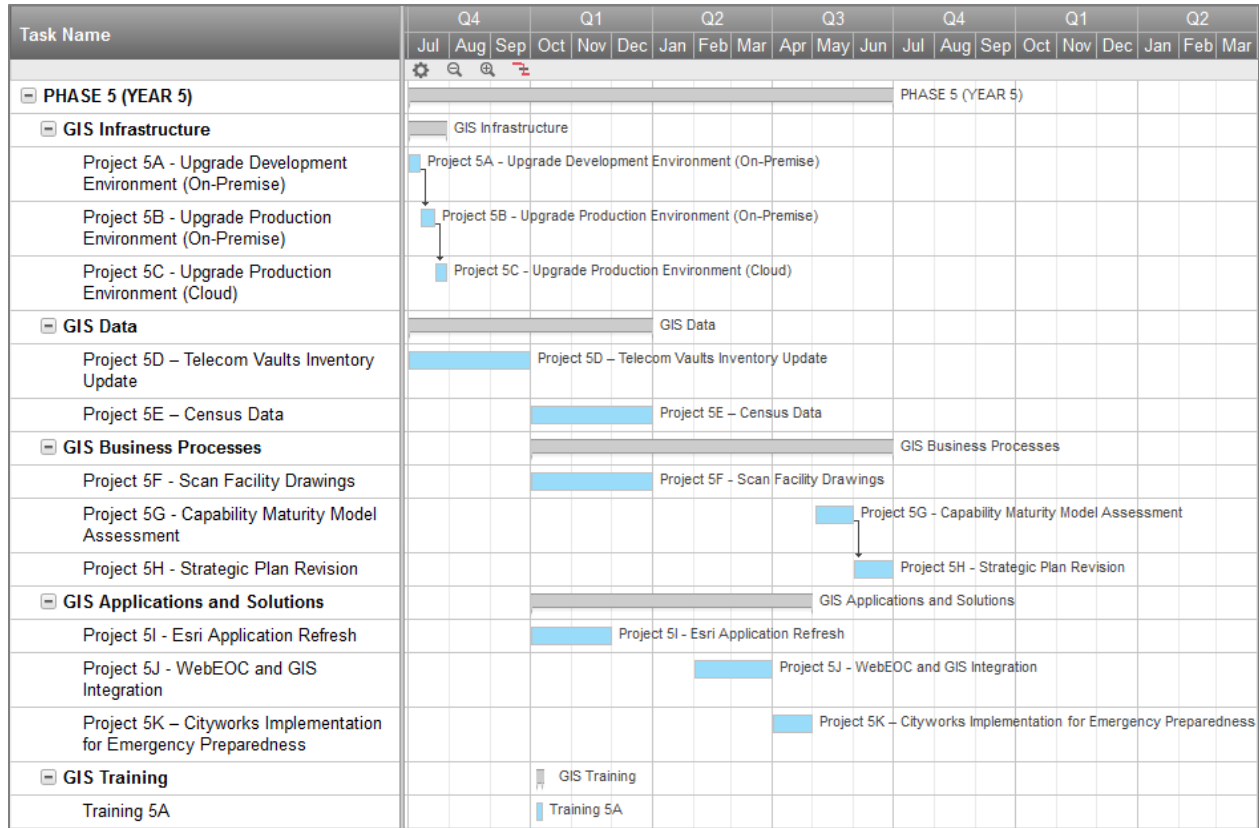


Figure 12: Phase 5 Timeline

## Appendix A - Needs Assessment Interview Summaries

### Information Technology and Communications / GIS

Interviewee(s):

- Bill Mitchell, Chief Technology Officer
- Don Quentin, Network Administrator
- Mariyah Serratos, IT Manager
- Teri Gerhardt, GIS Manager

#### *High Level Business Processes*

Information Technology and Communications (ITC) is in charge of managing the overall technology landscape of the City. This includes enterprise infrastructure, security, communications infrastructure, and IT governance.

The GIS Division manages and supports the Enterprise GIS infrastructure, provides support and training for the City's intranet Web Mapping application (MapGuide soon to be Magnet CSI), Cityworks the City asset management system and maintains the primary relationship with ESRI and Cityworks for software licenses.

#### *GIS Needs*

Poor connectivity due to an insufficient number of cell towers has negatively impacted the effectiveness of technology in the field. Field crews using Cityworks are forced to work disconnected or in some cases not use it at all, but continue to use paper forms that are later fed in to the system at the office. One of the options the City is considering is to use cell boosting technology to provide a stronger signal for crews using Cityworks mobile applications. This is part of a project in the City's work plan for the current fiscal year. The Implementation Plan in Section 4 assumes cell boosting technology will be in place during Year 1 of the implementation timeline.

The City has made significant investments in the Magnet permitting system. The original vision was for this system to support both GIS and permitting workflows. However, the product has not met the City's needs and the City is looking for a replacement. The replacement of Magnet and integration of GIS with a new permitting system is anticipated to happen in Year 3 of the Implementation Plan (See Project 3Q).

The GIS Division would like to see GIS be more visible in the organization. They would like the business processes in the City to be enhanced, with GIS providing core functionality and being deeply integrated with other systems. They would like to implement the best technology and provide the best support possible for GIS users by making available quality data, maps, apps and services.

Section 4 includes several projects that are intended to help the City address the above needs. These include projects such as Project 2O that embeds GIS in the City's website for greater visibility, and several GIS integration projects throughout the timeline.

The City is currently has not fully implemented an emergency operations center. The City would like to use GIS as part of emergency response and preparedness activities once an emergency operations center is in place. Project 5J and 5K includes tasks that would help the City meet this need. Cityworks software and user support is a major function of GIS. They would like to ensure the groups that use Cityworks are well supported both on and off the field and sufficiently trained. To address this, the City is in the process of hiring an Asset Management Technician whose main role is to actively support the Cityworks system and its users. The Asset Management Technician plays an important role and is present as a staffing resource in many of the projects proposed in Section 4.

## Public Works – Design

### Capital Improvement Projects (CIP)

Interviewee(s):

- Katie Jensen, CIP Manager.
- John Raymakers, CIP Project Manager

### *High Level Business Processes*

The CIP group is in charge of identifying capital improvement projects that improve the city's infrastructure and facilities. This group reviews CIP project proposals and advises the council on which projects to implement. This group also designs, manages the construction, and delivers to completion, approved CIP projects to the City. The group interfaces actively with outside consultants who provide construction and engineering services.

As part of this process, the CIP group regularly needs to research, verify, and gather information from various sources. To view and access GIS information, the CIP group uses MapGuide and/or Magnet. The group also accesses Laserfiche to look up scanned documents such as improvement plans, easement documents, recorded maps, deeds, etc.

The CIP group also conducts public outreach by providing project status updates using a GIS project viewer accessible to the public.

### *GIS Needs*

The primary need expressed by this group is the ability to access any and all scanned documents from GIS based applications such as MapGuide and Magnet. This functionality currently exists in the GIS applications mentioned, however, the collection of documents available through these applications is incomplete. The problem is two-fold. Firstly, the City has not been consistent in scanning and storing recorded documents in the Laserfiche system. There are many paper files that could be scanned and loaded in to Laserfiche for easy retrieval through GIS. For scanned documents, the pdf format is preferred over tiff format. Laserfiche needs to be reorganized with appropriate folder, project and document naming conventions, and a consistent way of storing scanned documents. Secondly, the GIS viewers do not have the full functionality desired, to access scanned documents in Laserfiche. Only certain kinds of documents can presently be retrieved.

There is a need to organize documents such that a “live view” is presented about a property. This “live view” includes the set of documents that represent the most recent work done at the property. This would save the group a lot of time and avoid conducting repetitive studies, services and duplicating work.

There is a need to organize certain project documents in a “legacy folder” such that records of all work ever done at a certain property are easily retrieved.

The process to update the map as part of public outreach is cumbersome. Feedback from the group suggests that it would be ideal for CIP project managers themselves, to update information about their project (e.g. contact, status, etc.) in the GIS projects viewer.

The protocol for what is scanned and the process of storing documents needs to be improved.

The group needs easy access to external information found within websites such as the census.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include Project 1I for re-organizing Laserfiche and workflows to scan and store documents, Project 2M for revising CIP projects update and public information workflow, and Project 5E to obtain Census data.

## Development Services

Interviewee(s):

- Chad Mosley, Sr. Engineer
- Jo Anne Johnson, Senior Engineering Technician

### *High Level Business Processes*

The Development Services group is in charge of construction of CIP projects and review of development activity in the City. This includes reviewing plans for residential, commercial and industrial and conducting inspections to ensure conformance with City standards. This group also conducts traffic surveys that allow the City to manage traffic flow within the City. This group has a GIS editor who regularly uses ArcMap to edit Public Works datasets.

### *GIS Needs*

The primary needs expressed by this group include the ability to retrieve linked scanned documents from GIS applications, quickly. The group also feels that the Magnet application has a very complicated user interface (UI). They would like a simpler UI and be able to perform workflows with “fewer clicks”.

The group would like to see the latest maintenance information from Cityworks, so that there is less time spent on research. In addition, they would like to add notes for certain assets so that others in the organization can view shared information. This allows for a one stop shop for all information.

The group noted that applications such as ArcMap and MapGuide have a very different user experience. They would like a single application that provides all the information they need for their workflows.



The group would like to see a public facing application that allows constituents to search for plan documents related to their property. This would reduce having to answer calls from the public.

The group would like to see active / proposed and public / private storm data as well as sidewalk data to help with distinguishing infrastructure ownership when performing maintenance activities.

The Survey group would like better capability to query and search GIS assets. For example, if a user wants to see all 36" lines, he/she should be able to send or generate an expression that matches the query and returns corresponding results. In addition, the system should have a better "identify" function that would allow users to click or tap on a GIS feature, and display attributes for that feature in a convenient location on the screen. The group also would like to see map tips that appear when hovering over features.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 1M for setting up BuildingEye to provide better information to the public, Project 3Q that will provide a better one stop shop GIS viewer and reduce research time, and several data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## **Traffic Engineering**

Interviewee:

- Julie Chen, Transportation Engineer

### ***High Level Business Processes***

The Traffic group is in charge of management of traffic flow in the City. They collect traffic counts to help plan and maintain the adopted level of service for the City's street system. The group also contributes toward transportation planning projects such as the Bicycle Transportation Plan and programs such as Safe Routes to Schools.

### ***GIS Needs***

The Traffic group would like to see historical traffic survey information. The surveys include speed and volume information. Currently these are stored in paper file format, and the desire is for the surveys to be scanned and stored in Laserfiche. As part of planning efforts, the group is open to using real time average speed data from Waze as input for traffic studies. However, this data would not be a deciding factor as traffic studies have to be officially stamped to be approved.

Other datasets this group is interested in seeing includes collision data and traffic signs symbolized appropriately.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 2K and 2L that will update traffic related scanned documents, and data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## Community Development

### Building

Interviewee(s):

- Phuong Devries, Building Plan Check Engineer
- Phillip Willkomm, Planning Senior Code Enforcement Officer

#### *High Level Business Processes*

The Building group reviews building permit applications and building plans to ensure compliance with the City's building code and ordinances. This group also assigns new addresses and processes requests for change of address.

#### *GIS Needs*

This group mostly uses MapGuide to verify information in the GIS during plan check and permit review workflows. However, the MapGuide application is out of date and the data is not being updated. So the information that is available to the group is out dated. The group does have access to Magnet but they are currently not using it actively. The group feels that Magnet's overall performance is slow although this has recently been improved.

This group would like to see solar panel locations in a map especially at the front counter. This data has been difficult to find.

Their imagery needs include being able to see historic aerials.

Project 3Q in the Implementation Plan is anticipated to help address the needs for this group, when a new permitting system is implemented and integrated with GIS.

### Planning

Interviewee(s):

- Gian Martire, Associate Planner
- Erick Serrano, Associate Planner
- Ben Fu, Assistant Director of Community Development

#### *High Level Business Processes*

The Planning group performs long range planning, current planning, zoning designation and land use planning activities. They advise the planning commission, design review committee, and the environmental review committee on development issues and related planning guidelines in the City. The group reviews planning permits, enforces the city's municipal code and develops specific and master plans for special projects.

#### *GIS Needs*

This group is using a combination of Magnet and MapGuide for mapping and data needs. Neither application seems to be providing the full functionality required. The group is looking for an application

that would be a “one stop shop” for all their information research needs. The application needs to provide the ability to accurately measure distances and areas when viewing lots and building footprints overlaid on aerials. This functionality currently does exist in Magnet but the user experience did not seem to be straightforward. Similar to the Public Works group, this group also expressed a need to be able to use the mouse to hover over features and view map tips. The group would like to zoom in to a smaller scale on the map display in Magnet. This is currently possible only if aerials are turned on since the imagery basemap is cached to a smaller scale than the vector basemaps.

The group would like to provide the public, access to the same information available to internal staff. This includes information such as status of planning applications, building permits, code enforcement cases, etc. This could be done using a user friendly application such as BuildingEye<sup>24</sup>, or San Francisco Planning Department’s property map<sup>25</sup>. Magnet’s Portal application was slated to provide this functionality but currently, the City is unsure when that would be realized.

The group would like to see properties that use recycled water from the City as well as external providers. This currently can be searched for in Magnet but no on the map.

Older building permits are currently being scanned in to Laserfiche. Eventually, this group would like all permits in the system and be able to view historic planning projects.

Other needs include having Google StreetView type of functionality made available to them.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 1M for setting up BuildingEye to provide better information to the public, Project 2G to view recycled water properties, Project 2J to update building permit scanned documents, and Project 3Q that will provide a better one stop shop GIS viewer.

## Economic Development

Interviewee:

- Angela Tsui, Economic Development Manager

### *High Level Business Processes*

The Economic Development group is in charge of promoting business opportunities in the City and assist with starting a business. They manage real property records and business license records.

### *GIS Needs*

This group currently uses MapGuide for GIS information. They frequently look up parcel data. As part of their business objective of encouraging growth and development in the City, this group would like to be able to analyze concentration of businesses by type in a certain area. Potentially, this would include drawing a radius and filtering out businesses of a specific type within that radius. This would also allow answering questions such as “what’s around me”? Examples of types of queries this would help answer

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<sup>24</sup> <http://www.buildingeye.com/>

<sup>25</sup> <http://propertymap.sfplanning.org/>

include how close a school is to a certain liquor store or a business with an ABC license<sup>26</sup>, where the nearest office space is to a certain address or point, etc. Additionally, the group would like access to traffic count information that would help businesses decide on the best areas for locating their business.

Project 3Q in the Implementation Plan is anticipated to help address the needs for this group, when a new permitting system is implemented and integrated with GIS.

## Code Enforcement

Interviewee(s):

- Gulu Sakhrani, Code Enforcement Officer
- Phillip Willkomm, Senior Code Enforcement Officer
- Jeff Trybus, Code Enforcement Officer

### *High Level Business Processes*

This group is responsible for enforcing the City's Municipal Code and related policies that seek to help maintain property values and create a healthy, aesthetically pleasing community<sup>27</sup>. There are two full time field officers who respond to calls and report violations using CitizenServe<sup>28</sup>. The field officers receive complaints from multiple sources including calls, onsite feedback and through Comcate<sup>29</sup>.

### *GIS Needs*

Part of this group's workflow is to send violation notices to property owners. As a result they need accurate parcel and property information in the map which they access through Magnet and in CitizenServe which allows them to generate the notices. Accurate property information helps avoid sending notices to the wrong address/owner. Currently, they sometimes face issues with property information in the parcels layer not being up to date. They need to verify data in Metroscan to confirm the parcel data is accurate. They would like property information in CitizenServe to be updated on a monthly basis instead of a quarterly basis.

Although they do have parcel information available in the field, access has been an issue. It is sometimes difficult to determine from the map if parked vehicles are on city or private property or if a complex has one or multiple owners. Also as part of this workflow, the group would also like to access aerial imagery in the field to verify locations.

A layer with police beats needs to be added to the map to better understand which area they are working in.

They would like to standardize the naming convention and codes for violation categories so it is easier to understand and uniform. There are some codes that are repetitive and not needed.

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<sup>26</sup> <http://maps.gis.ca.gov/abc/lqs/>

<sup>27</sup> <http://cupertino.org/index.aspx?page=359>

<sup>28</sup> <http://www.citizenserve.com/Main/citizenserve-home.html>

<sup>29</sup> <http://www.comcate.com/>

One of the field officers has a hard time pulling up information on the iPad. This seems to be an issue IT can resolve after checking the connection and access settings.

This group would like a map that shows violations and code enforcement cases by status (current, closed, etc.). In addition, they would like to see violation history to understand patterns and trends of occurrences in the City.

Project 1P in the Implementation Plan is anticipated to help address the needs for this group, when a new CRM system is implemented and integrated with GIS.

## City Clerk

Interviewee:

- Kirsten Squarcia, Deputy City Clerk

### *High Level Business Processes*

The City Clerk's office maintains the vital records of the City including resolutions, ordinances, policies adopted by the Council, minutes, agendas, budget documents, etc. They maintain historical records of the above information. They respond to requests for information from the public using information from their digital archives. They also oversee the election process to the City Council and provide information to voters and candidates.

### *GIS Needs*

This group expressed interest in being able to retrieve scanned documents from Laserfiche via a mapping interface. Being able to pull easements, annexations, grants and other record documents would be helpful as they get calls from the public asking for such information. This group needs to send notices to residents near a certain location whenever there are public hearings. Currently the group relies on the planning department to generate the mailing lists for them. They would like to be able to generate the mailing lists themselves using a tool. In addition, they would like to use a conflict of interest tool that would help determine which commissioner is in conflict with a decision at a property before going to council.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 1I for re-organizing Laserfiche and workflows to scan and store documents, and Projects 2H and 2I that include updating scanned documents that are needed by the City Clerk's office.

## Finance

Interviewee(s):

- Richard Wong, Accountant
- Lisa Taitano, Finance Manager
- Cheuk Law, Sr. Accountant

### ***High Level Business Processes***

This group is in charge of accurate and timely maintenance of all City financial records, the collection and disbursements of funds, processing payroll, audits, generating financial reports, monitoring and tracking capital budgets, and utility billing. In addition, they maintain business license data and provide businesses with information regarding compliance with the Business License Tax Code. The group is using Magnet for GIS data look up.

### ***GIS Needs***

This group has a need to audit fixed assets such as vehicles and equipment issues. They would like to access and use Cityworks to maintain and track information on fixed assets. They would like to be notified when new facilities are added to Cityworks. This will help track billing information better. They also would like to view business license information in the GIS.

This group would like to link water meter locations to billing software. Eventually, they would like the ability to track water usage and if a property is being charged appropriate fees based on water usage, and thus expose areas where audits are needed. Additionally, this group would like to access the status of CIP projects. This will help the group understand what assets are being impacted due to ongoing projects.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 2M that will allow viewing latest CIP data, and Project 2P that will link GIS and financial software that can help track usage.

## **Human Resources**

Interviewee(s):

- Laura Miyakawa, HR Analyst II
- Mary Redwine, Admin

### ***High Level Business Processes***

This group is in charge of attracting and retaining a quality workforce for the City. As part of this, they perform onboarding activities and activities related to promoting the City to potential employees.

### ***GIS Needs***

As part of their onboarding process, the group is interested in using a story map tour application that would showcase the City and its facilities to potential new employees, and for orientation and recruitment of new hires. GIS can also be used to provide information on projects the City is currently working that would be of interest to new employees.

Project 3P in the Implementation Plan includes building Story Maps specifically for Human Resources that will help address the needs for this group.

## Recreation and Community Services

Interviewee(s):

- Barbara Banfield, Recreation Coordinator / Naturalist
- Gail Seeds, CIP Project Manager
- Rebecca Shaffer, Admin
- Mariah Dabel, Senior Recreation Manager

### *High Level Business Processes*

The Recreation and Community Services group organizes community events within City park facilities that provide recreational and educational activities. As part of this, they conduct targeted marketing and outreach so residents are better informed about events and availability of city facilities for such events. This effort includes trying to reach more customers and targeting specific audiences such as schools and neighbors to increase attendance levels at events. The group also participates in parks and recreation planning, and planning improvements at these facilities.

### *GIS Needs*

This group is currently using MapGuide to consume GIS data as part of planning and outreach workflows. As previously stated, MapGuide is a legacy application that is not regularly maintained and will soon be replaced. They are in need of an alternate modern viewer that will display up to date GIS information and meet functionality requirements.

This group would like to have access to a central repository of property records and scanned documents to look up improvements done at park facilities. MapGuide currently has limited integration with the Laserfiche document management system.

This group would like a better way to understand where, when and what events are happening at a more regional scale. This will allow them to better inform and direct the public to events. This also helps in better event planning and marketing. Part of the need here is also to be able to better inform the public about volunteering opportunities at the various events that are taking place in the region. This could be served to the public using a mobile app that shows park locations and calendar of events at the various locations. This app should also be able to conveniently show what is the closest park facility at a given locations and what events are happening there.

As part of outreach, they would like to be able to use story maps that will attract kids to nature events and other activities, and also be able to showcase existing events.

As part of expansion planning efforts, the group would like to understand and be able to analyze and report to the City Council certain demographics about event attendees. Examples include determining who attends the events, where they come from, and what percentage of attendees are City residents. The group plans to purchase and use membership management software (e.g. PerfectMind) that will provide some of this functionality. Integrating the data from this software into GIS will be helpful in visualizing the information spatially and could help better manage rental facility reservations; by displaying what amenities are available in a given park and the parks capacity. The current parks and

recreation finder is a good tool that already helps with this, but some data is missing. There are a few trail destinations that need to be added to the application.

Amenities at parks need to include features such as electric outlets. The GIS Division is currently working on adding park furniture data into the system. When there are new amenities or events, GIS can be used to help determine where sign posts can be placed in the ground that notify the public about these amenities and events. Road closure information is also needed to help notify the public about traffic events. The City's existing partnership with Waze can be leveraged to provide this capability.

This group is also interested in viewing water meter locations and their status along with underground infrastructure such as water and sewer lines. Well and water rights information is also needed as part of workflows.

As part of water monitoring and creek monitoring activities, the group is in need of better topography data that allows them to show the realignment of Stevens Creek. MapGuide shows the old contour data that shows the creek in the old location. Magnet has the 2015 contours that show the creek in the correct location.

The group would like to create and print simple maps that can be included in council reports.

The group possesses tree data of trees along the creek, tree locations collected by kids as part of nature programs, and golf course trees that would be of value to the existing City tree inventory.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 1I for re-organizing Laserfiche and workflows to scan and store documents, Project 1R for integrating GIS and PerfectMind software, Project 3O for building Story Maps specifically for Parks and Recreation, and several data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## **Stormwater**

Interviewee(s):

- Cheri Donnelly, Environmental Programs Manager
- Alex Wykoff, Environmental Specialist

### ***High Level Business Processes***

This group is in charge of stormwater system inspections and ensuring businesses and private properties are in compliance with state stormwater mandates. Staff update an access database with information on C4 business inspections. The access database is further used to help with their reporting requirements to the state. Other information maintained includes the list of C3 projects with treatment measures and C5 list of annual property violations.

The group obtains business license information from Finance on a monthly basis, which contains a list of all new businesses which helps them determine their inspection schedule.



### **GIS Needs**

As part of their inspection workflows, the group would like to be able to view locations of storm drains and lines within private properties that connect to the public storm system. They would like to see flow information within the system. They also need to be able to see attachments (pdf's, images, etc.) of the assets in the system.

The group also maintains a history of violations. They would like to see this historical information in the GIS and be able to perform analyses that allow them to see trends and patterns of violations. Being able to query violations by year and severity level is quite important to the group. This also helps with planning current and future inspections.

The group would like to have a map that shows pervious and hardscaped areas that allow them to determine where water will runoff. The map should also help determine private vs public properties.

The group's mapping needs also include being able to see locations of private properties with infiltration basins. The water board requires these to be inspected. Locations of new business licenses are also needed.

Other data needs for the group include being able to view trash enclosure locations. The list of locations is currently stored in a spreadsheet that can be used to map these out. Once built, the group is open to using a simple web app that would help them maintain this information.

The group would like to view drainage basins covered by each inlet in the GIS, so they can see where the cause of a contamination or increase trash in a catch basin is coming from.

The group currently uses MapGuide for GIS information look up. They will need a more modern viewer that will replace MapGuide and offer better user experience and functionality.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 3D to view a history of storm drain violations, Project 3G for obtaining data on hardscaped areas, and several data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

### **Sustainability**

Interviewee(s):

- Katie Nomura, Utility & Efficiency Analyst
- Misty Mersich, Sustainability Coordinator

### **High Level Business Processes**

This group is in charge of implementing the City's Climate Action Plan measures. The Climate Action Plan defines many strategies to help reduce greenhouse gas emissions and provide energy, water, fuel, and cost saving ideas for residents and businesses<sup>30</sup>. As part of this directive the group tracks the City's

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<sup>30</sup> <http://www.cupertino.org/index.aspx?page=704>

utility and energy consumption and savings. This includes tracking solar installations and usage, municipal water usage, energy efficiency upgrades in municipal buildings and public facilities and associated savings, fleet vehicle usage, energy retrofit program status, and a travel demand management program.

### *GIS Needs*

To assist with tracking water usage from irrigation, this group recently inventoried all the water meters in the City. They now need an inventory of the water valves. They are looking to obtain water lines from San Jose Water and Cal Water and Sewer data from the CSD. They would also like to know the irrigated area in square feet for each controller in medians and parks. They would eventually like to determine the water budget for each irrigated site.

With water meters done, they next would like to inventory electric and gas meter locations as well. They have a list of PG&E meter locations in excel format but they need to be field verified.

To better track and maintain a history of information they collect, the group plans to use an energy monitoring and utility data management system called Lucid<sup>31</sup> in the near future. They are interested in being able to link this with the GIS system<sup>32</sup>.

The group would like to work with the Trees group to get data on net new trees planted as part of their Climate Action Plan initiatives. Currently they only have access to existing trees in the City. Additionally, access to tree removal permit information would be helpful.

The group would like a map that helps visualize locations of certified green businesses. The building footprints layer could be used for this purpose but it does not have an attribute that includes this information. The Magnet viewer has this information shown in the table view. A related need is that they would like to more clearly distinguish actual buildings/facilities versus structures such as bathrooms, sheds, etc.

The EV charging stations layer needs to show public vs private information.

The solar installations layer needs to show size of house, capacity and year of installation details.

As part of energy tracking efforts, the group would like to have heat maps of energy use in the community using data from PG&E across the City.

As part of encouraging ridesharing and promoting alternative transportation modes, the group is interested in a map that shows locations where employees live that can be used as a planning tool for their employee commute program.

The group is interested in improving how they track maintenance activities related to energy consumption. For example, they would like to be able to track street light change outs and impact of

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<sup>31</sup> <https://www.lucidconnects.com/>

<sup>32</sup> Based on preliminary research, Lucid seems to already have a mapping interface

using energy efficient lighting in the City. This information is needed for annual reporting purposes. Once the Street Signal group begins using Cityworks, this will be easier to obtain.

Overall, the group would like a streamlined process where they are able to efficiently collect data related to the Climate Action Plan, Green House Gas inventory and Green Business inventory from other departments in the City. They are interested in using GIS as a tool for this purpose.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 1Q that will integrate Cityworks and Fuel Management Software, Project 2Q that will integrate GIS and Lucid, and several data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## Streets

Interviewee(s):

- Brad Alexander, Supervisor
- Shawn Tognetti, Streets Maintenance Worker III
- Andy Badal, Maintenance Worker II

### *High Level Business Processes*

This group is responsible for maintaining assets on streets such as pavement, signs, streetlights, markings, sidewalks, curb, gutter, storm system assets, etc. The group actively uses Cityworks for maintenance activities. Storm inlet inspection records created by this group are used by the Stormwater group (see Page 79), for their reporting requirements.

### *GIS Needs*

The group faces connectivity issues when using Cityworks in the field. Some field crew members find it more convenient to come back in to the office and input information into Cityworks. This is especially true if it is storm assets that they are inspecting. For signs, it is easier to update information from the field. To overcome connectivity issues in the field, alternate solutions are needed. These may include using hotspots in field trucks, signal boosters, etc.

Often times, when crews are in the field responding to a certain workorder, they observe condition of other assets and have a need to create workorders from the field. They would like to have at least one laptop that allows them to create workorders in the field itself.

Some crew members feel that the Cityworks mobile application can be cumbersome to use. Some workflows in the application seem to have more steps than necessary. This in turn does not make training new crew members easy. Staff suggest that training must be provided bi-annually as a refresher to newer crew members.

The workflow to maintain information about striping and raised pavement markers needs to be revised. Currently, when a work order is created, staff print the work order along with a map, then go to the field and create an asset in the field, if an asset is not already present. Ideally, they would like assets to be created by Engineering, and the field crew will create a work order against the existing asset, go to the

field, adjust the asset location if needed, and edit install date and other attributes. The group would like more collaboration with the Engineering group to make this workflow more streamlined.

The group would like to be able to use route optimization when driving to various assets in the field to complete work orders and maintain assets. The City is looking to leverage its partnership with Waze to be able to provide this functionality to field crews. Such functionality can be used by multiple groups.

The group would like a Pavement Condition Index Map that not only helps visualize pavement repair needs, but also can help prioritize and establish the pavement plan.

Another dataset this group needs is updated sign posts data. They have been using an older dataset to create work orders from. The City is looking to capture the latest data by establishing a project and hiring interns that would collect the information in the field. An important aspect of the data collection would be to get sign install dates. This helps with cyclical workorders. The City considers this a high priority project.

The group would like to see locations of PG&E power boxes along with street lights data.

Other datasets the group is interested in is a layer of accurate monuments, water and gas valves (and other underground infrastructure), sewer manholes, sewer cleanouts, and AT&T vaults.

The Implementation Plan in Section 4 includes several data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## **Trees/ROW**

Interviewee(s):

- James Steed, Maintenance Worker III
- Jason Fauth, Maintenance Worker III

## **High Level Business Processes**

This group is responsible for maintaining City trees and assets on the public right of way such as median landscaping, Christmas lighting on medians, backflows, controllers and irrigation meters. The group actively uses Cityworks as part of maintenance activities.

## **GIS Needs**

The City's connectivity issues affect this group as well. Moreover, this group uses VDI which is very slow, to connect to Cityworks. Due to the above, only one crew member uses it on a regular basis. VDI has mostly been phased out in the City and this group is one of the remaining few that still use it. The City plans to transition this group shortly to using mobile networks like the rest of the field crews.

As part of inspecting irrigation assets, they would like to have locations of irrigation valves and master valves added to Cityworks.

When renovating a site, they would like to see plans of what was done previously (e.g. plant lists). Renovations are done yearly. This group would like to be able to query what renovations were done in a

given year. Being able to see how much water was saved after median renovation will be helpful when doing their annual reporting for grant funding. A more long term desire is to be able to install Bluetooth sensors and report water usage directly to City Hall. Controllers currently have flow sensors but these have been turned off because they did not work as expected. Usage data is obtained from monthly water bills instead.

The group would like the map in Cityworks to have better accuracy. More specifically, they would like right of way setbacks and property lines to be accurate so that they can measure from setback to property line and determine if a tree is within the public right of way.

They would also like to create their own searches and be able to filter the data as needed. Capability to perform better analytics would be nice to have. They would also like to be able to create work orders for other groups when they see issues on the field. This however, is likely to cause confusion if there is no streamlined way of creating workflows.

This group needs batch editing capabilities. Currently, they edit tree features one at a time and would like to speed up the process by being able to select a group of trees on the map and change some common attributes at the same time, or even remove the selection from the map.

This group also uses VDI technology to access Cityworks from the field. Due to connectivity issues, the application might time out, but gives no indication that it has. Staff have sometimes lost work because they continued to enter information on a timed out application. Staff do not want the application to time out. With the City already transitioning all staff out of VDI, this group will eventually move to accessing Cityworks via mobile networks.

The group would like to have a Tree specific asset form within Cityworks. This would allow them to store more specific information about trees. Currently, they input general descriptions and comments that repeat and these can be converted to actual form elements.

One big request made by the group was to have a training program on using Cityworks but broken into modules. For example there could be training modules specific to the Tree group's workflows such as stump grind module, inspection module, etc. This would help train new hires or even provide refreshers to existing staff on a bi-annual basis.

Another aspect that is of great interest to this group is better coordination among departments in charge of various maintenance operations in the City. Specifically, this group would like the implementation of "schedule chaining" or activity dependencies when scheduling maintenance activities. Certain "dependent" activities should be allowed to be scheduled only after certain preceding activities have been marked complete. An example of this is that asphalt cannot be scheduled before tree work is scheduled and also completed. The City has been talking about hiring an asset management technician that would essentially play a role of ensuring activities are scheduled in a more streamlined and orderly fashion. Additionally, maintenance efforts should be optimized by breaking the City in to maintenance areas that all departments follow on a coordinated schedule.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 4F to update plant lists, annual training in Cityworks modules, Project 4I to evaluate schedule chaining, and several data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## Grounds

Interviewee(s):

- Brian Gathers, PW Supervisor, Grounds
- Cliff Mabutas, Maintenance Worker III

### *High Level Business Processes*

This group is responsible for maintaining assets in City park facilities including park irrigation assets (backflows, controllers, irrigation meters, valves and pumps), park furnishings, structures and ground cover.

### *GIS Needs*

This group is currently not using Cityworks but is scheduled to do so in the near future. The group would like to have an inventory of assets in the park such as trash cans, dog poop dispensers, bbq stands, electric meters and outlets, and others and maintain attributes for these assets such as date of installation, manufacturer, etc. GIS has built data models for this group which need to be populated with information and implemented within Cityworks.

As part of maintenance activities, this group would like to retrieve improvement plans on the field so they understand what work was previously done. The ability to view history of what was done (e.g. playground equipment installed, etc.) would be good to have. They would like to add backflow testing reports to the Laserfiche system so they are available in the field.

They would like to see locations of main breaks.

Among the items they are looking to track in Cityworks (in addition to asset maintenance) are fertilizer usage and water usage. Monthly water usage data will help them understand watering requirements and create water budgets.

The Implementation Plan in Section 4 includes several data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## Traffic

Interviewee(s):

- Paul Tognetti, Traffic Signal Technician
- Mike Vandever, Traffic Signal Technician

### ***High Level Business Processes***

This group is responsible for maintaining traffic signal assets such as traffic cameras, traffic meters, signals, heads, loops, poles, cabinets, termination boxes, fiber optic cables and enclosures. They also conduct traffic studies and adjust traffic signal timing as needed in the City.

### ***GIS Needs***

This group is currently not using Cityworks but is scheduled to do so in the near future. Like many other groups, they too would like to retrieve improvement plans and drawings in the field. Intersection plans are currently in hard copy format and will need to be scanned in to Laserfiche. They also have historical traffic count data that they would like to access digitally.

This group anticipates that the City's partnership with Waze will provide useful information regarding traffic conditions.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 2K and 2L that will update traffic related scanned documents, and data update projects that will benefit this group (See Data Inventory Matrix on Page 22).

## **Community Outreach**

Interviewee(s):

- Laura Lee, Community Relations Coordinator
- Ken Ericksen, Citizen Corps Coordinator

### ***High Level Business Processes***

The City has a robust community services program that conducts several activities such as neighborhood watch, emergency preparedness, volunteer emergency response, and block leader programs. Maps are regularly used to locate homes of block leaders, neighborhood watch meeting participants, and track coverage of the leader's outreach efforts. The group also uses maps for locating city owned poles that have neighborhood watch signs. The poles are maintained by the Streets group using Cityworks.

### ***GIS Needs***

This group needs a streamlined way of disseminating information to block group leaders about activities, meetings and other events, including being able to send notices to the nearest block group leader to an event.

The group uses a volunteer portal that has a lot of useful information that needs to be loaded in to Magnet. Currently, there is no integration between the two systems and it is inefficient to go back and forth between the two when looking up information or conducting a search (e.g. permit information). They would like one system that allows them to lookup permit information, easily select which block leaders to notify and send notifications.

They would also like to be able to notify the public about agency activities. This is similar to the need for having an application such as BuildingEye which was expressed by the Planning group.

The group in charge of volunteer emergency response expressed concern that the City may not be prioritizing emergency preparedness by creating evacuation plans, locating shelters, etc., and lay the groundwork for effective response if a major event happens. The group would like to see a Citywide emergency response plan and cost recovery processes and measures in place that includes a plan for using the City's GIS resources.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 1I for re-organizing Laserfiche and workflows to scan and store documents, and Project 1R for integrating GIS and PerfectMind software.

## **Fleet and Facilities**

Interviewee:

- Mike Loomis, Lead Mechanic

### *High Level Business Processes*

This group is responsible for maintenance of the City's fleet vehicles and building facilities.

### *GIS Needs*

This group would like to see a map of all city owned buildings and facilities that includes locations of assets such as boilers, electric and gas meters, a/c units, phone line binding posts, etc., and information related to these assets. Once assets and facilities are mapped, the group would like these to be linked to the City's financial software for better tracking purposes. The sustainability group is interested in being able to track upgrades to assets in buildings for their reporting purposes. So these two groups need to be able to have a workflow where information is shared seamlessly.

This group would also like to be able to retrieve as-builts and mechanical plans from the Laserfiche system as part of workflows. There are some plans that need to still be scanned in to the system.

This group also expressed an interest in being able to track man hours spent in each building.

The fleet Maintenance group would like to enhance the filters and form elements available to them in Cityworks. The GIS Division is working to refine the forms to be relevant to the Fleet and Facilities group. They are planning to integrate a new fuel management system with Cityworks. The Sustainability group is interested in being able to access this information for their reporting purposes. The Fleet and Facilities group would also like to be able to send alerts when work on a vehicle is complete.

The Implementation Plan in Section 4 includes projects that are intended to help the City address the needs above. These include projects such as Project 1Q that will integrate Cityworks and Fuel Management Software, Project 2P that will link GIS and financial software that can help track usage, and Project 5F that will allow updating scanned facility drawings.