Garrett Park Arboretum Workflow Management

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Abstract

In Fall of 2021, our team of five University of Maryland students enrolled in the Capstone Project course (INST490) led by Prof. TJ Rainsford, embarked on the consultancy assignment for the Town of Garrett Park. The focus of the project was the Town's arboretum workflow management. The project proposal and requirements were determined under the patronage of the Partnership for Action Learning in Sustainability (PALS), the UMD's campus-wide initiative to engage faculty and students in projects that help partnering jurisdictions address their real-world challenges (UMD NCSG, n.d.).

After a comprehensive analysis of services and information needs related to arboretum management, we have researched and identified actionable insights and technology solutions that, as we believe, could bring significant improvements to the current workflow. The following report is a summation of our findings.

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Introduction

The Town of Garrett Park is a historic community located in Montgomery County, Maryland, just northwest of Washington, DC. The town's population is around 900 and its land spreads over an area of 0.3 square miles (U.S. Census Bureau, 2019). Since 1977, Garrett Park has held the official designation of an Arboretum (The Town of Garrett Park, n.d.). Holding this status, the Town is responsible for planting and maintenance of all existing trees and shrubs in its registered arboretum collection on the town's public spaces as well as the right-of-way portions of private properties across the jurisdiction. The current inventory of the town-managed trees exceeds 1,500 and the management of related tasks is conducted using a series of spreadsheets and the online ArcGIS map; the reliance on email, phone, and verbal communication between participants is also prevalent. The Town's Office manages Council-approved services in collaboration with members of the town's elective Arboretum Committee and contracted Arboretum Consultant. In addition, much-concerted effort is made to promote and educate town residents on the benefits of sustained care for the town's arboretum with the underlying goal to facilitate residents' engagement in the process.

Context Analysis

To gain a better understanding of the context for our project, we started by taking a comprehensive look at the Garrett Park municipality from a wider perspective. We wanted to know about stakeholders, the mission, and the general place the maintenance of the town's tree collection held in the town's overall operational activities. To do that, we conducted the MOST analysis, where we considered the mission, objectives, strategy, and tactics as they related to the town's arboretum.

Project Goals and Deliverables

The main goal of the project is to reassess the current workflow at Garrett Park Arboretum and implement a method that streamlines Arboretum-related management tasks. This can be accomplished through the use of technology and a change in the current workflow at Garrett Park. One of the deliverables that were listed in the scope of work for the project was a project initiation document and project plan. The project initiation and project plan document allowed the team to create a plan for the project as well as get a better understanding of the scope of the project. The next deliverable stated a requirement of having documentation of strategic services related to arboretum management and associated workflows; information needs; and information technology used, as needed. The team gave a mid-semester presentation that summed up the needs of Garrett Park and a workflow was presented during our midterm presentation that captured the current workings of the Arboretum. As for a final recommendation, our recommendations are highlighted in the forum of a workflow that was presented to the client and is represented by The management workflow diagram (service request lifecycle). Another required deliverable is data visualizations of arboretum expenses. This is shown in the cost analysis section below and was presented to the client. Lastly, the final report and presentation on project outcomes. The final presentation was given to the client on Monday, December 6, 2021. This presentation showed our recommendations to the client as well as our process in completing the project.

Methodology

I. Process:

After getting well-familiar with the project's objectives, we proceeded with a data-gathering process which included meetings with the Town Office Staff as well as reviewing of the Town's website and examination of existing spreadsheets, tree inventory map, and two reports, Garrett Park Comprehensive Arboretum Plan Part I and Part II (Natural Resources Design, 2019). Having all the necessary background knowledge, we aligned our approach with the Theory of Constraints (Blackstone, 2011) and began identifying constraints that would guide us in subsequent research for the most suitable software solution; the solution that would meet the constraints, thereby eliminating them as the actual limiting factors. Our discovery process included:

1. Identifying workflow demands and decision-making sequence
2. Outlining general requirements regarding system components.

Our assessment has revealed that at the center of managing the maintenance of the Garrett Park Arboretum is the lifecycle of each service request, as it is initiated by either Town Office Staff, Arboretum Consultant, Arboretum Committee Member, or any Garrett Park resident. Analyzing stages of a single service request helped us gain a better understanding of WHO, WHAT, and the SEQUENCE in terms of actions performed throughout the process. The final diagram is a conceptualization of sequential phases in the management workflow of a single service request.

The second area of inquiry was to determine general system requirements of the software that would meet the needs of the analyzed workflow. We concluded that the cloud and subscription-based SaaS (System as a Service) would be the most viable option that would assure seamless system updates and ultimately lower cost than the maintenance of the custom-build technology. The access to continuous customer service and ongoing training for new users would also be important aspects to consider.

Furthermore, taking under consideration the outdoor nature of tree maintenance and assessment tasks, the mobile entry point to the system, and the capability of direct image uploads would also be useful functionality.

II. Challenges:

Although we were able to finish the project relatively smoothly, there were a couple minor challenges. The first issue we came across was our access, or lack of, to the software for workflow management. Since we were a student group, we could not get direct access to the software or even something more ideal like a demo. This meant we could only rely on the information that was available on the companies' websites and other public information. We wanted to do as much in-depth research as possible before making a recommendation that would require more advanced technology use due to the nature of our clients technology background. While we were not able to have direct access to the software, we used information that was publicly available such as webinars and handbooks to the best of our ability. We also recommended that before the client moves forward with our recommendation, request a demo with the software company to best assess if this was a good software for their needs.

We also dealt with the usual misunderstandings between the student group and client. There were misunderstandings of the limit we could go as a student group as well as staying within the scope of the project. This required us to meet with the client and reestablish our objectives. In addition, we had some internal confusion that required us to seek out the professor for clarification.

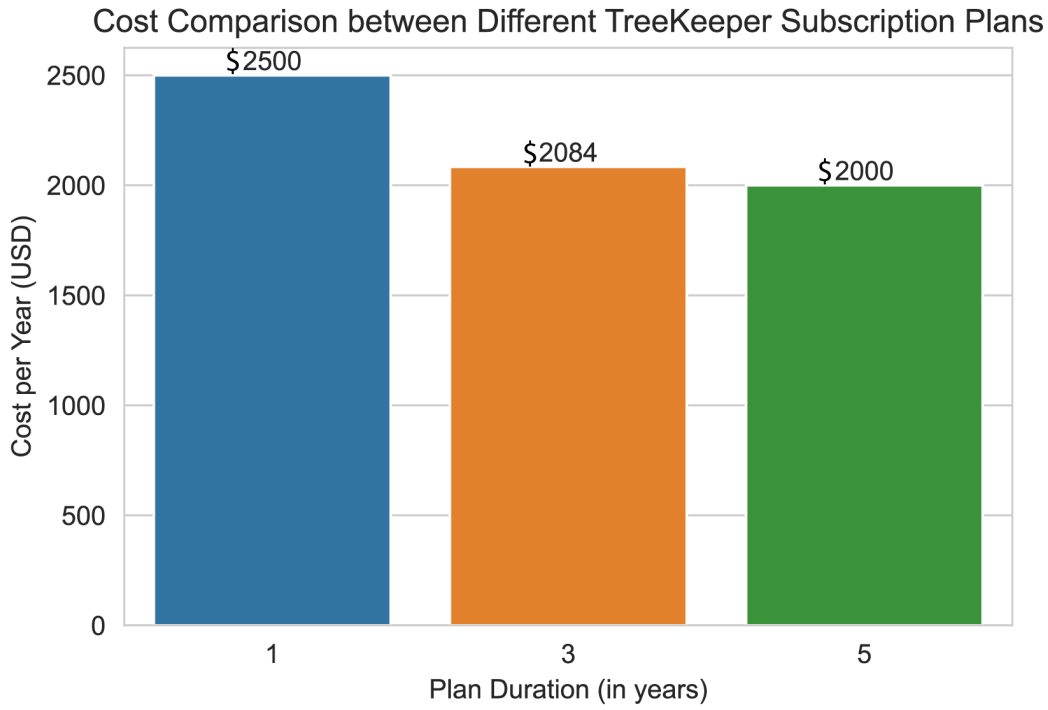
Findings

When researching different solutions, we narrowed our search using the requirements of this project to pick a potential software. After thorough research on what is currently on the market, we decided on recommending TreeKeeper because it meets or is customizable to the needs of our client. The first requirement that had to be met was version control. TreeKeeper has the ability to change records globally, which means selecting a species and editing the records of that species. The next requirement is the cost of implementation and software. The cost of using TreeKeeper is based on subscription plans, for one year it costs $2,500, 3 years is $6,250, and 5 years is 10,000. The software can also be used to streamline communication in workflow management because there are different layers. This allows different levels of access, for example, contractors can see what has been assigned to them through the calendar feature or update their work orders. Residents can call in their requests and TreeKeeper will be able to keep information about each call. Another need to consider was if training is provided, training and support are available either through Davey's support center or through their only videos and manual. A need for a treemap was also in the scope of this project and TreeKeeper has different mapping capabilities such as seeing the trees in street view, putting each of the sites in quadrants, and providing a way to link a website on the map. Importing data was another concern and on TreeKeeper, data can be imported through excel sheets. There are multiple reports that can be generated from the data stored in Treekeeper. For example, you can do a species summary which can show you different areas the species are located and their conditions. Custom reports can either be a summary that shows the count of the specific attribute or a listing report which shows every record of the attribute. Matrix reports are similar to a pivot table in excel where the user is able to compare different attributes, if the user clicks on a specific attribute they will be taken to the map and view it there. There is also a dashboard that allows a quick overview of what is happening in specific areas. The user can view this information as a table or pie chart and can then export it as images or pdf. Lastly, users are able to record data from the field using TreeKeeper. The user is able to

take pictures and upload them into TreeKeeper as well as add new sites. To add sites there is a center me feature that allows the software to see the user's exact location and add a site to that location.

Cost Analysis

The following bar chart shows the cost difference between different subscription plans.



Note that the difference in cost between the 1 year and the 3 year plans is far greater than the difference between the 3 year and 5 year plans.

Recommendations for Future Actions

In order to gain the most complete understanding of the software, it is recommended that the Town of Garrett Park would get in contact with Davey, the software vendor responsible for the creation and distribution of the TreeKeeper software, in order to request additional, detailed information on matters that the team was unable to determine, such as how long the onboarding and training processes would take, etc. It is also advised that the Town of Garrett Park would reach out to the other organizations that currently utilize the TreeKeeper software in order to get the perspective of an entity that is a current user of the software. A few of such organizations were identified, and their contact information was forwarded to the Town of Garrett Park previously.

With this new information in mind, if the Town of Garrett Park should be intent on proceeding, the next step would be to schedule an in-depth demonstration of the TreeKeeper software from the software vendor themselves. If TreeKeeper is identified as the preferred path forward, then a potential future project team could assist the Town of Garrett Park with integrating TreeKeeper into their arboretum workflow management process.

Should the Town of Garrett Park have further questions or require any sort of follow-up information, the project team can be reached at sshaikh2@terpmail.umd.edu.

Appendix A

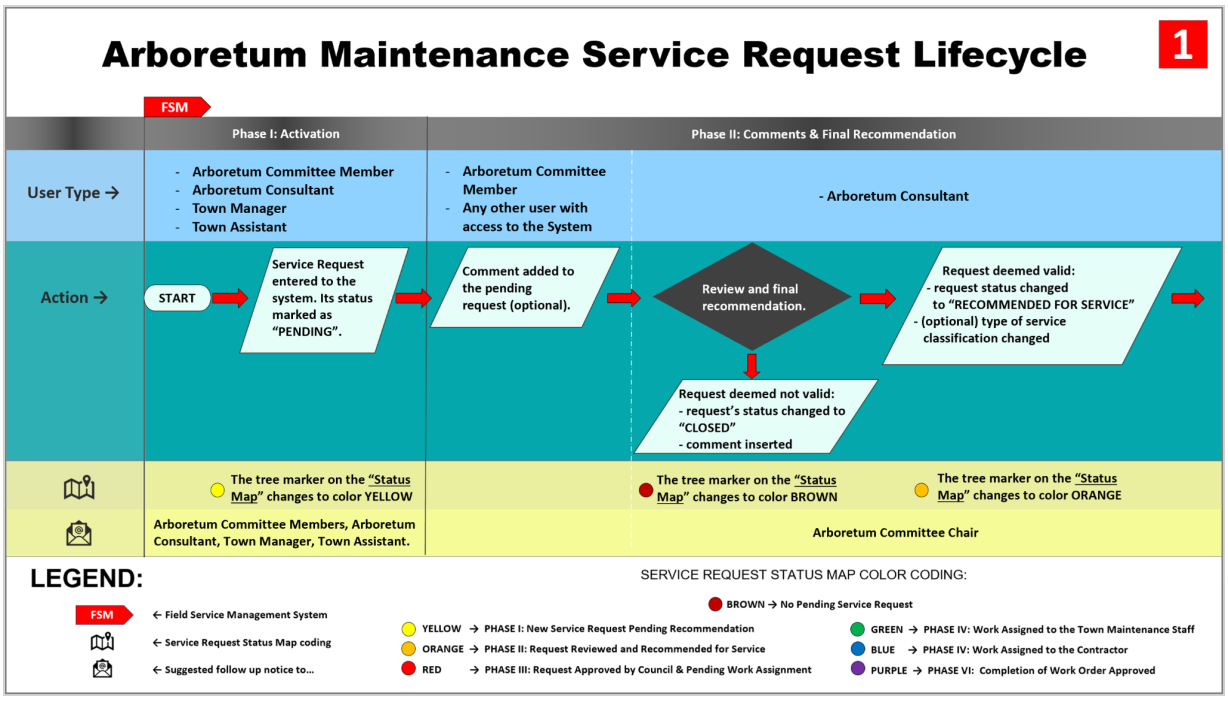
MOST Analysis:

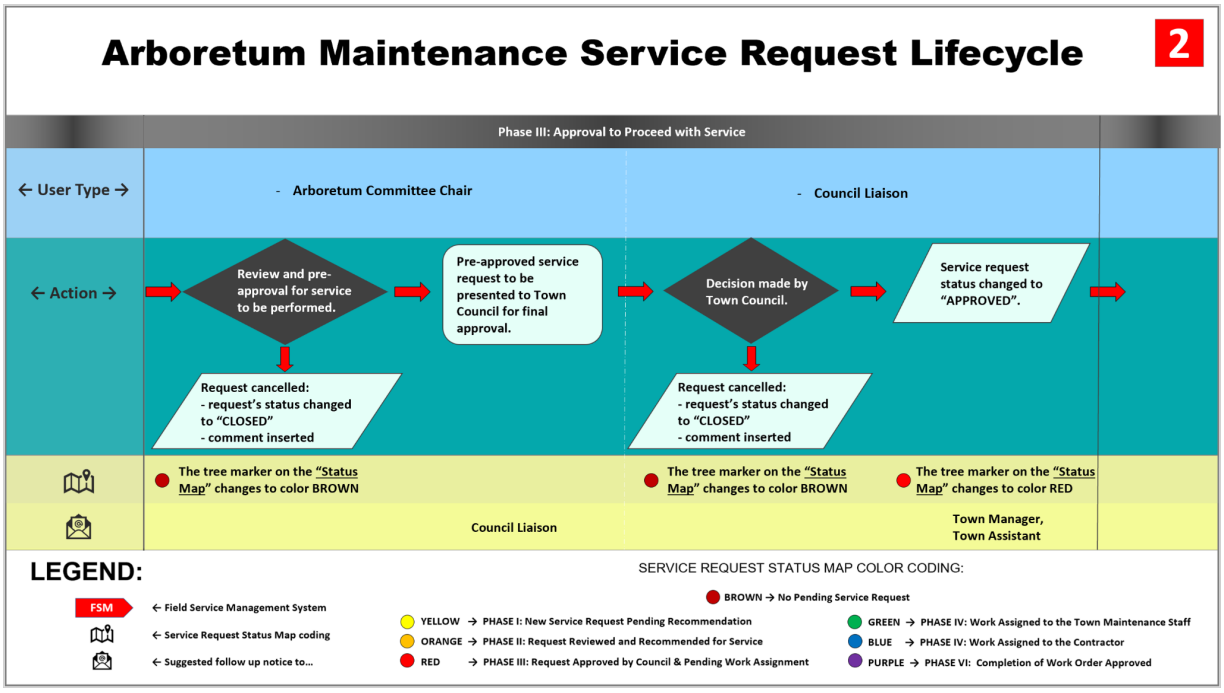
Appendix B

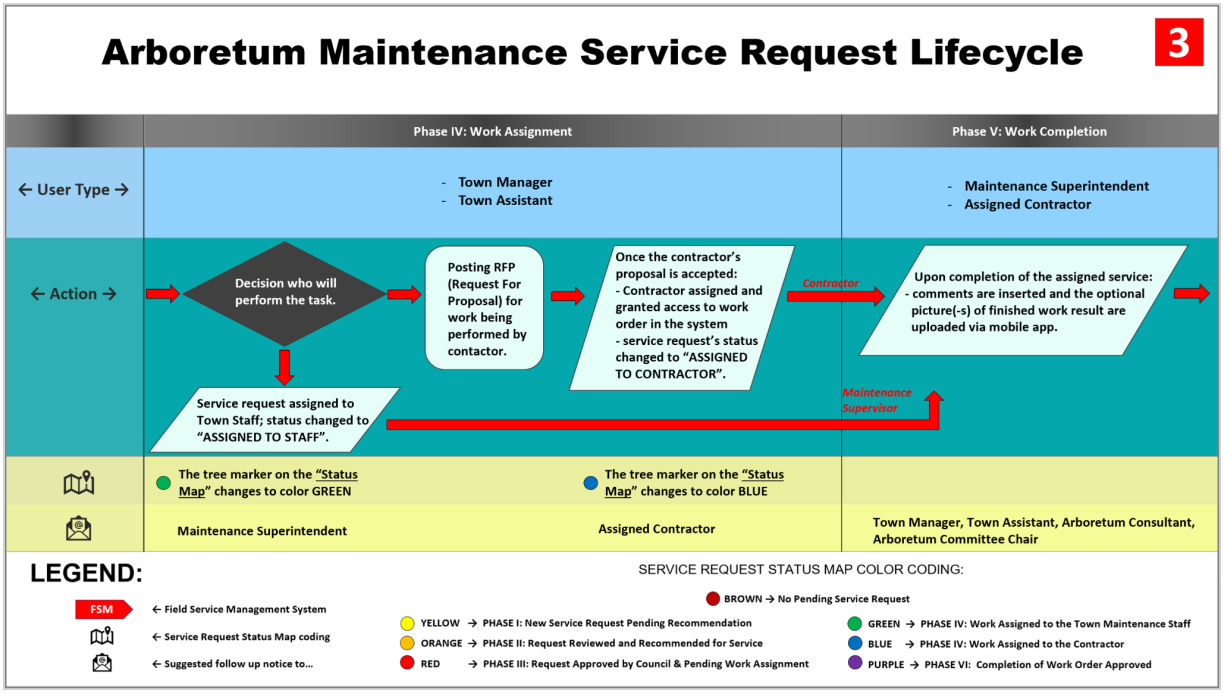
The management workflow diagram (service request lifecycle)

Without referring to any specific "technology" the model establishes that each phase in the service request lifecycle is characterized by the user type, performed action, and required follow-up notice. The diagram also contains the fourth characteristic, our tentative assignment of the color-coding on a status map, typically a useful component in managing any field-related work.
The diagram shows that once the service request is activated, it goes through 7 phases.

It is worth noting that this model considers a difference between initiating and activating a service request. For instance, any town resident can **initiate** the service request via Resident Portal on the Town's website or by calling the Town's Office, but the actual **activation** of that request happens when it is entered into the maintenance management system (marked with the red label as FSM - Field Service Management).




Arboretum Maintenance Service Request Lifecycle
2
Phase III: Approval to Proceed with Service
← User Type →
- Arboretum Committee Chair
- Council Liaison
← Action →
Review and pre-approval for service to be performed.
Pre-approved service request to be presented to Town Council for final approval.
Decision made by Town Council.
Service request status changed to "APPROVED".
Request cancelled:
- request's status changed to "CLOSED"
- comment inserted
Request cancelled:
- request's status changed to "CLOSED"
- comment inserted
The tree marker on the "Status Map" changes to color BROWN
The tree marker on the "Status Map" changes to color BROWN
The tree marker on the "Status Map" changes to color RED
Council Liaison
Town Manager, Town Assistant
LEGEND:
FSM ← Field Service Management System
← Service Request Status Map coding
← Suggested follow up notice to...
SERVICE REQUEST STATUS MAP COLOR CODING:
BROWN → No Pending Service Request
YELLOW → PHASE I: New Service Request Pending Recommendation
ORANGE → PHASE II: Request Reviewed and Recommended for Service
RED → PHASE III: Request Approved by Council & Pending Work Assignment
GREEN → PHASE IV: Work Assigned to the Town Maintenance Staff
BLUE → PHASE IV: Work Assigned to the Contractor
PURPLE → PHASE VI: Completion of Work Order Approved


Arboretum Maintenance Service Request Lifecycle
3
Phase IV: Work Assignment
Phase V: Work Completion
← User Type →
- Town Manager
- Town Assistant
- Maintenance Superintendent
- Assigned Contractor
← Action →
Decision who will perform the task.
Posting RFP (Request For Proposal) for work being performed by contactor.
Once the contractor's proposal is accepted:
- Contractor assigned and granted access to work order in the system
- service request's status changed to "ASSIGNED TO CONTRACTOR".
Contractor
Upon completion of the assigned service:
- comments are inserted and the optional picture(-s) of finished work result are uploaded via mobile app.
Service request assigned to Town Staff; status changed to "ASSIGNED TO STAFF".
Maintenance Supervisor
The tree marker on the "Status Map" changes to color GREEN
The tree marker on the "Status Map" changes to color BLUE
Maintenance Superintendent
Assigned Contractor
Town Manager, Town Assistant, Arboretum Consultant, Arboretum Committee Chair
LEGEND:
FSM ← Field Service Management System
← Service Request Status Map coding
← Suggested follow up notice to...
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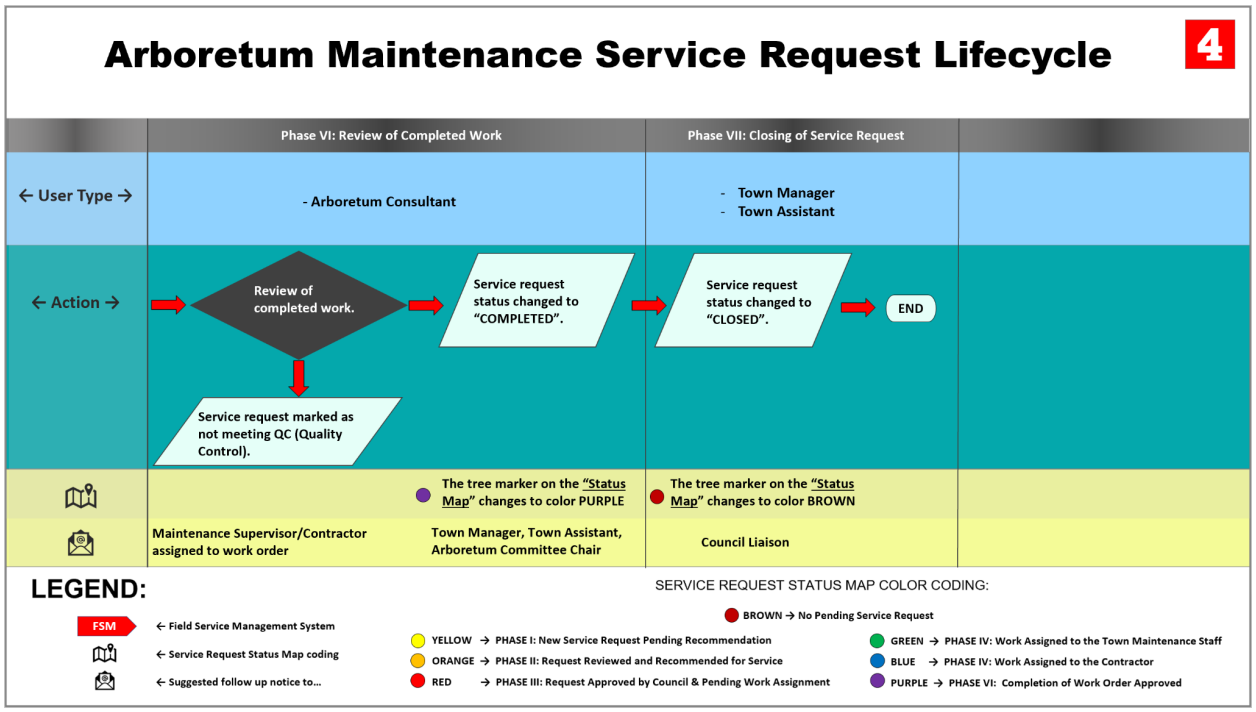
Arboretum Maintenance Service Request Lifecycle
4
Phase VI: Review of Completed Work
Phase VII: Closing of Service Request
← User Type →
- Arboretum Consultant
- Town Manager
- Town Assistant
← Action →
Review of completed work.
Service request status changed to "COMPLETED".
Service request status changed to "CLOSED".
END
Service request marked as not meeting QC (Quality Control).
The tree marker on the "Status Map" changes to color PURPLE
The tree marker on the "Status Map" changes to color BROWN
Maintenance Supervisor/Contractor assigned to work order
Town Manager, Town Assistant, Arboretum Committee Chair
Council Liaison
LEGEND:
FSM ← Field Service Management System
← Service Request Status Map coding
← Suggested follow up notice to...
SERVICE REQUEST STATUS MAP COLOR CODING:
BROWN → No Pending Service Request
YELLOW → PHASE I: New Service Request Pending Recommendation
ORANGE → PHASE II: Request Reviewed and Recommended for Service
RED → PHASE III: Request Approved by Council & Pending Work Assignment
GREEN → PHASE IV: Work Assigned to the Town Maintenance Staff
BLUE → PHASE IV: Work Assigned to the Contractor
PURPLE → PHASE VI: Completion of Work Order Approved

Appendix C

TreeKeeper Software - online resources

Main website:

https://www.davey.com/environmental-consulting-services/treekeeper-inventory-management-software/#contact-section

Webinars containing demos on the most up-to-date functionalities of the software:

1. https://www.gotostage.com/channel/86a49f80873842dc9b91df62f2466ad8/recording/83018c32c9124b4f924dc245540b1d57/watch?source=CHANNEL
2. https://www.gotostage.com/channel/86a49f80873842dc9b91df62f2466ad8/recording/782d5a9e30944678b2d18abc970da174/watch?source=CHANNEL

Shortlist of some of the municipalities/entities using TreeKeeper software:

1. Prospect Park in Brooklyn, New York
   https://www.prospectpark.org/learn-more/what-we-do/sustaining-environment/trees/treekeeper-database/

2. Missouri State 417-836-5265 or 417-836-4904

3. LA parks 213) 485-4826
   https://www.nrpa.org/parks-recreation-magazine/2015/january/digital-tree-management-improves-l.a.-city-parks/

Appendix D

Requirements Table

Comparison of requirements of the project with the abilities of TreeKeeper:

Requirements	Meet	Customizable	Does Not Meet
Version Control	Yes		
Cost	Yes		
Streamlining Communication in the Management Workflow	Yes		
System Training and Support	Yes		
Handle Resident Requests/Inquiries	Yes	Yes	
Mapping Capability	Yes	Yes	
Importing Existing Data	Yes		
Generate Reports	Yes	Yes	
Field Data Entry (Mobile Access)	Yes		

Deliverable Links:

Project Plan/ Initiation Document

Final_Presentation

Mid-Semester Presentation

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