

REVIEW Current Systems.

Demonstrate current systems in use at the Town
Categorize system components into capabilities
Model requirements + workflows into capabilities



People



Process



Technology

A
G
E
N
D
A

Project Overview

Discovery Meeting Results

Current Work Processes

System Capabilities

Summary



Project Overview - REVIEW



REVIEW
Current
Systems



IDENTIFY
Opportunities



ROADMAP
Initiatives



DESIGN
Solution

- Participate in demonstration by Town staff of current system functionality and manual activities to pass work between departments
- Review system documentation and any documented workflows
- Categorize system components into a set of required system capabilities
- Document cross-departmental work processes where required



Project Overview - IDENTIFY



- Explore optimal work processes that enable digital capture, transfer, and management of information, based on required system capabilities
- Evaluate which capabilities can be delivered through the Esri ArcGIS Platform
- Identify systems that need to remain in place and suggest interface changes for integration
- Outline high-level integrations that automate and digitize cross-system and/or cross-department workflows
- Group Esri ArcGIS Platform capabilities, existing systems and required changes to interface points, and high-level integration workflows into opportunities



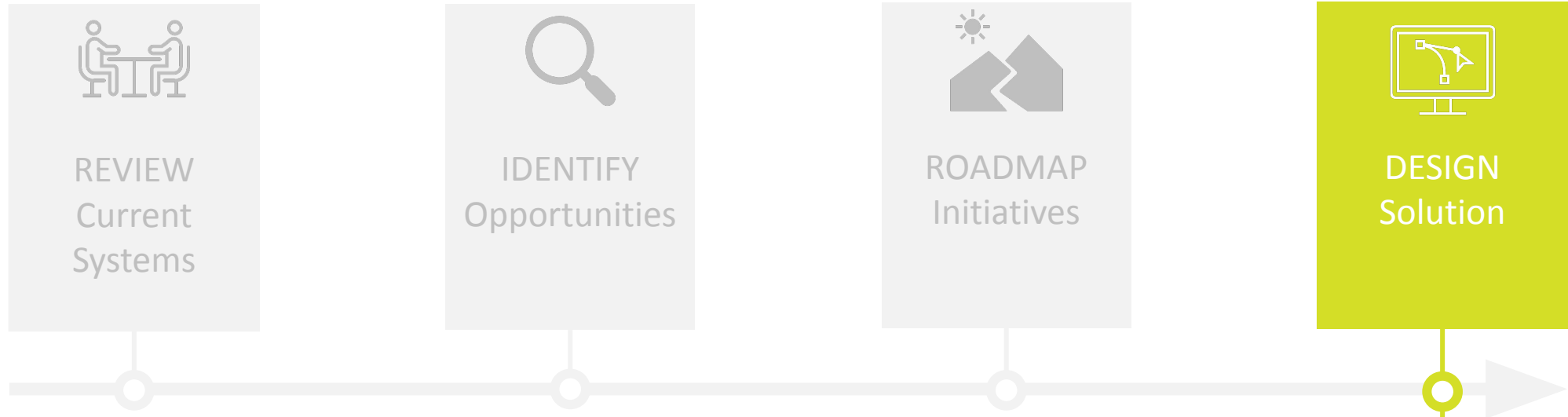
Project Overview - ROADMAP



- Group identified opportunities based on a small set of outcomes to form initiatives
- Decompose initiatives into a set of action steps to form action plans to achieve each outcome defined for the initiative
- Prioritize initiatives and provide a budgetary estimate for each
- Organize initiatives and action plans into a high-level schedule that fits the budget expectations for the Town



Project Overview - DESIGN



- Design the technical architecture that outlines all of the major systems and the integrations between
- List the modules and services in the Esri ArcGIS Platform to license to support all capabilities identified
- Identify the customization requirements for the Esri ArcGIS Platform to fully deliver the identified capabilities
- Specify the data exchange requirements and integration workflows between systems
- Generate an overall listing of use cases and requirements that define the solution architecture



Discovery Meetings

- The discovery meetings were held the week of 10 Jan 2022 to walk through current work processes at the Town and to demonstrate any technology used to support the work.
- Staff had the opportunity to show what worked and where there were issues with either current processes or technology.
- We also discussed staff ideas for an ideal work process and characteristics of a successful solution.



Road Patrol

Bob Goodfield demonstrated the road patrol application and the process for closing work orders.



Beautification

Dave Nicholls discussed the Esri apps used for forestry work, parks and playground inspections.



Public Works

Ryan Cook, Dave Vaccaro, and Christine Tonon discussed work orders and service requests



Corporate Services – Asset Mgmt

John Raso will be discussing the GIS tools used to manage all physical assets managed by the Town.

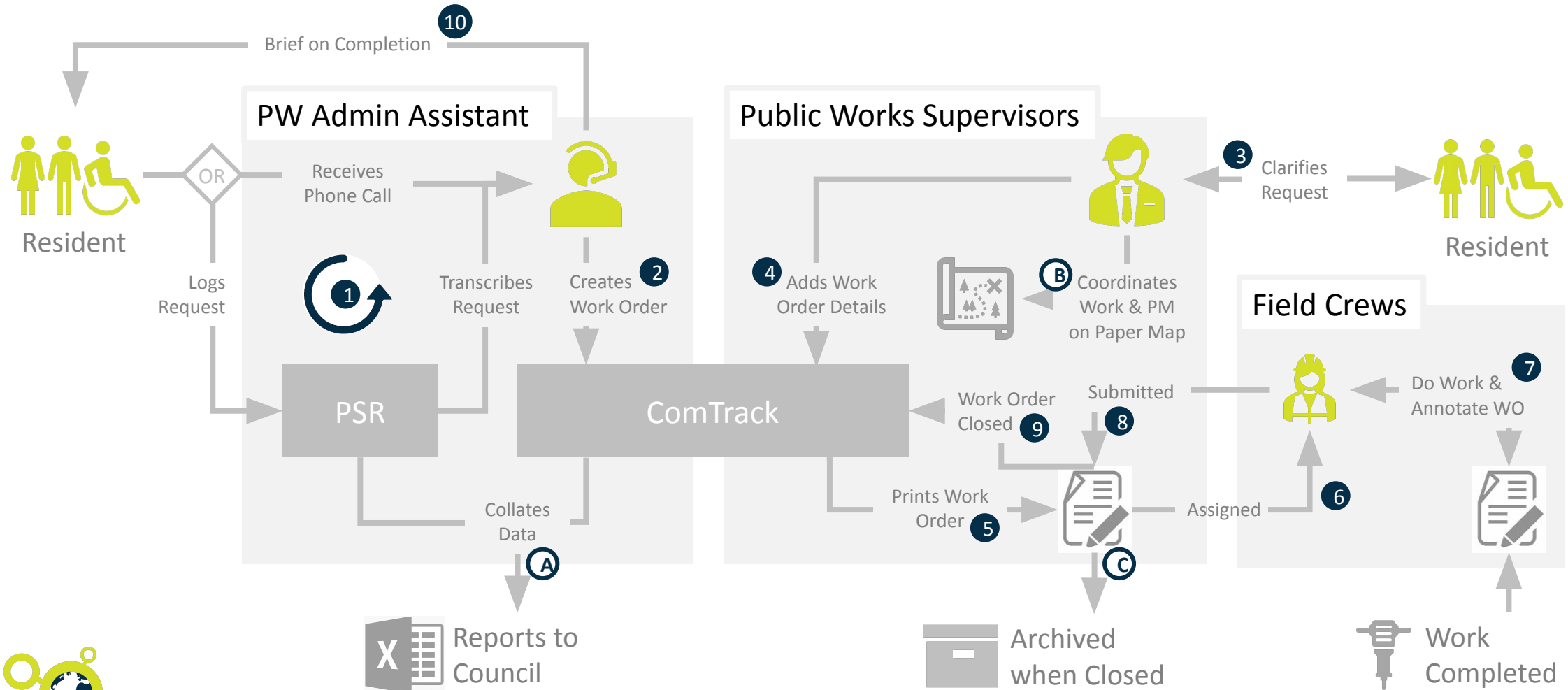


Common Issues

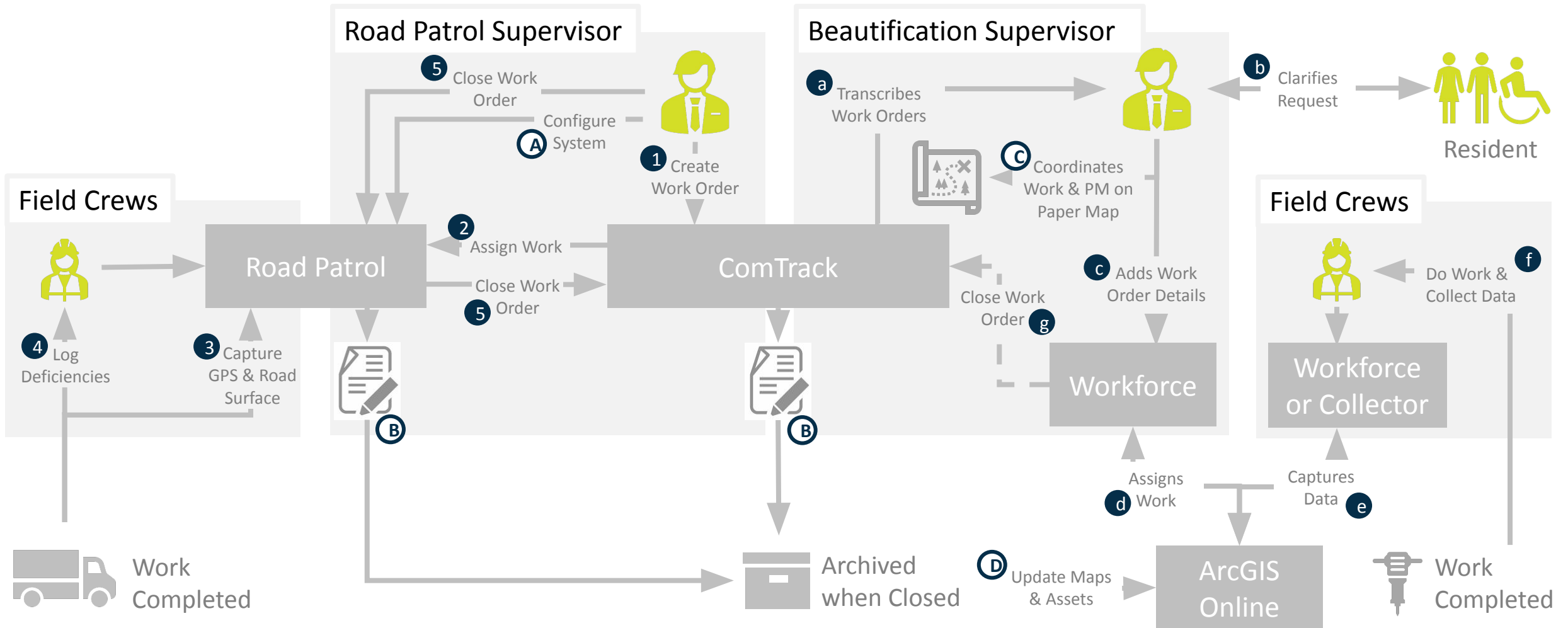
- Most of the process is paper-driven and history of activity is maintained in file boxes
- User interfaces are difficult to navigate and require paper records to support data management (i.e. closing a work order)
- Citizens have multiple ways to get in touch and log a service request – either through the portal, or a direct call to supervisors
- Technical tools are not easily configured, have form-based user interfaces that are difficult to navigate, and lead to poor uptake by staff.



Current Process – Service Requests + Work Orders



Current Process – Road Patrol + Beautification



A person in a light-colored shirt and dark pants stands on a wide staircase, viewed from behind. They are reaching out with their right hand towards a glowing, abstract digital interface. The background is a dark blue gradient with faint geometric patterns and a cityscape silhouette. The overall mood is one of progress and technological advancement.

System Capabilities

Major Capabilities. System Modules.

Major Capabilities



Service Request Portal

Multiple channels for citizens and internal staff to report complaints linked to reporting address or asset.



Work Management

Preventative or cycled maintenance schedules against assets with simple workflows and maps.



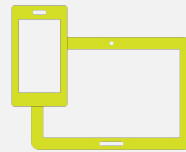
Maps & Asset Register

Assets are linked to a location, a facility, or vehicle and organized into a hierarchical registry.



Road Patrol

Capture road surface information and deficiencies for signage and street furniture that creates work orders.



Field Operations

Work orders and inspections are deployed to mobile apps that are location-based and context-driven.



Fleet Operations

Incorporate vehicle GPS locations, vehicle statistics, and operation status (plow, sand, etc.) from GeoTab.



Service Request Portal Capabilities



- View existing similar requests for service in a map or list view
- Log a service request through web, email, mobile, or social
- Subscribe to updates for an already posted service request
- Add photos or comments to an open service request
- Receive any requests for info by preferred communication channel
- Workflow by type of service request
- Escalation of service requests when level of service times are not met
- Receive comments from public works as they service the request
- Receive notifications of status change/close of service request
- Receive user feedback survey on the service request experience



Work Management Capabilities



- Create or connect to an asset registry
- Associate preventative maintenance schedule(s) to each asset
- Map view and select / query for assets that have a geographic representation
- Manage workflows and assignments by work order type, worker skills, required equipment, worker location, and other characteristics
- View current deployment of field crews to work orders
- Log labor effort (hours), equipment and material usage per work order
- Dashboard reporting of work-in-progress and key performance indicators on productivity and other measures
- Long-term capital planning and budgeting



Maps & Asset Register Capabilities



- Basemaps are maintained with Town reference data
- All assets are created as either geographic objects, or linked to geographic objects:
 - Infrastructure, buildings, and natural features (parks + trees) are geometries
 - Water meters and building systems are linked to buildings
 - Vehicles are linked to a yard, an administrative region, or other polygon AND have a GPS-based location
- Assets are organized into a hierarchy, such as building systems belonging to a floor in a building (building / floor level / system / component)



Road Patrol Capabilities



- Plan road patrol routes
- Overlay deficiencies already captured but not resolved
- Minimal user interface – select deficiency type while driving the vehicle
- Ability to link feed from road scanner
- Configure deficiency types for roads, signals, and signage



Field Operations Capabilities



- Map-based view from GIS
- Assets available for selection from map
- Work orders are map based
- Context-sensitive workflows with choices on form driving visibility and selection values for other components on a form
- Configurable field workflows by work type
- Share worker location while on shift – turn off location on breaks
- Worker can enter material and equipment usage as well as a timer per work order to collect time-based effort



Fleet Operations Capabilities



- Post vehicle GPS locations to GIS
- Share vehicle operating statistics with work management system
- Generate work orders when threshold conditions are met based on vehicle operating statistics
- Generate work orders based on preventative maintenance schedule(s)
- Capture and share vehicle operations such as blade up/down, spreader on/off to GIS
- Visualize plowed, sanded, and other vehicle-based operations in GIS



Summary

The service request and work management process is almost entirely paper-based, with the exception of Beautification.

Systems that are in place are not connected together to enable larger workflows, systems are not easily configurable, and paper print-outs are the easiest way to work with current systems.

There are six major capabilities required to fully digitize the service request and work management process:

- Service Request Portal – Work Management – Maps & Asset Register – Road Patrol
- – Field Operations – Fleet Operations –



People



Process



Technology

Spatial DNA

IDENTIFY Opportunities.

Optimize work processes in use at the Town

Identify Esri components that support desired capabilities

Model overall solution architecture



People



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Project Overview

Ideal Work Processes

Match Esri Solutions

Solution Architecture

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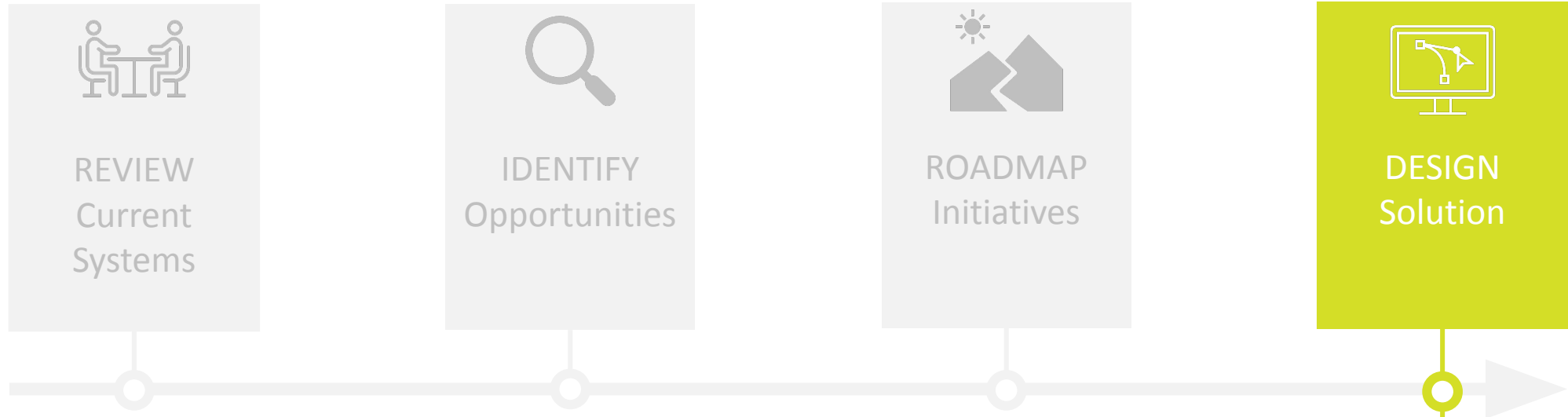
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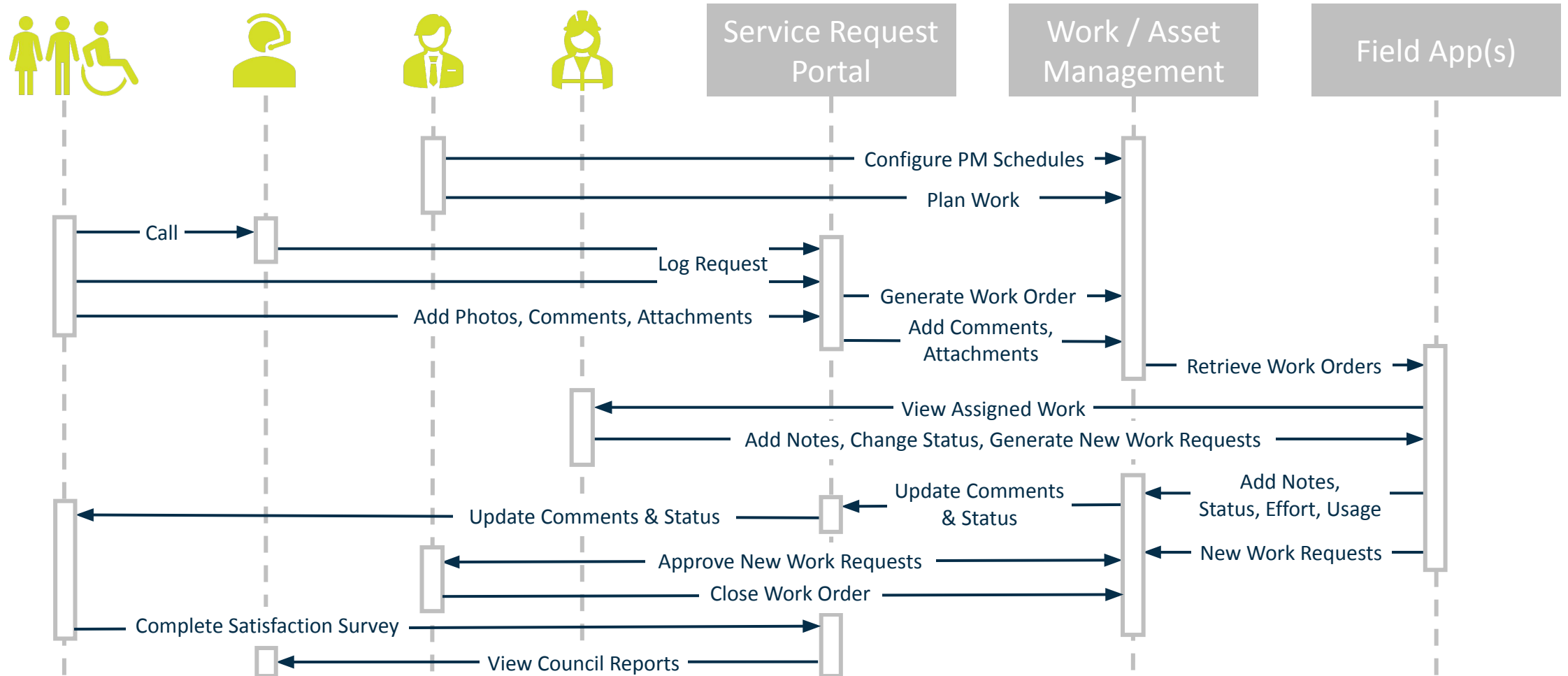
Project Overview - DESIGN



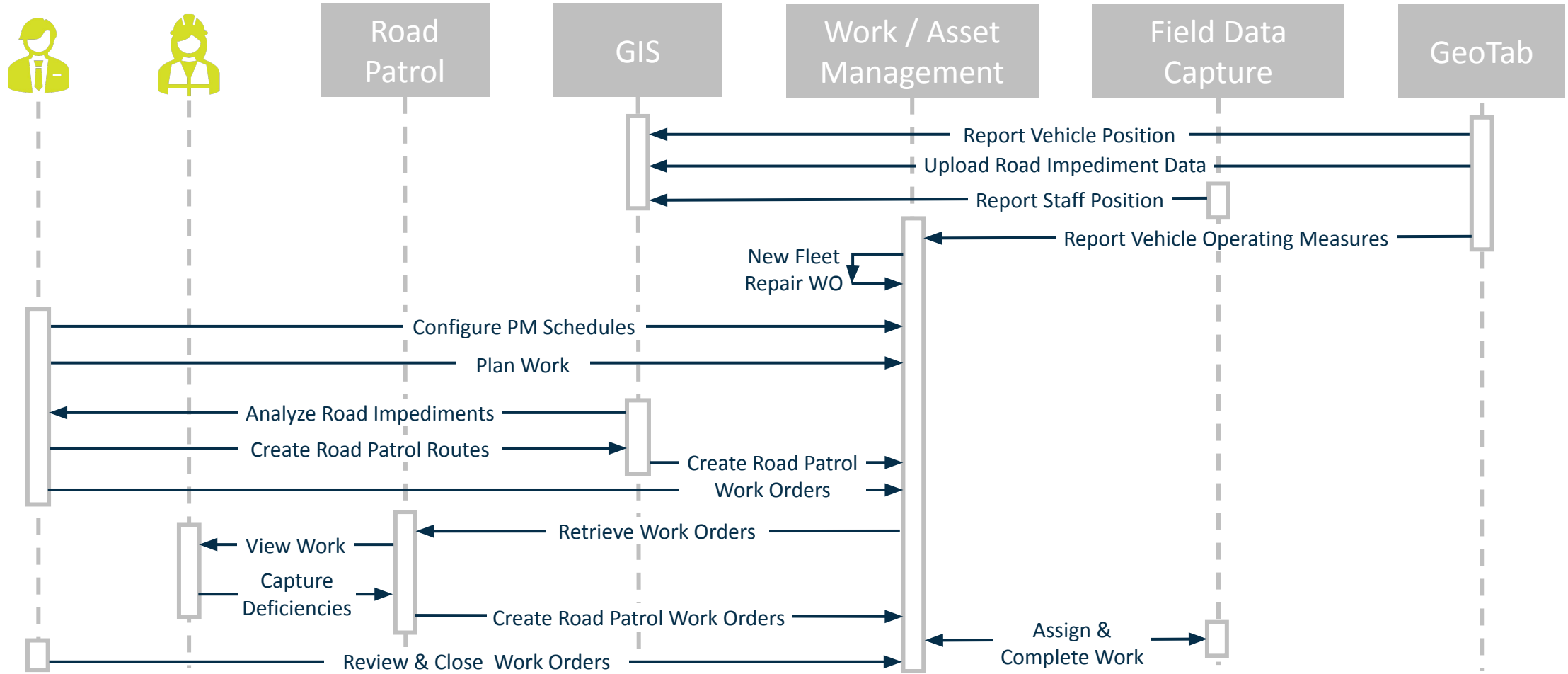
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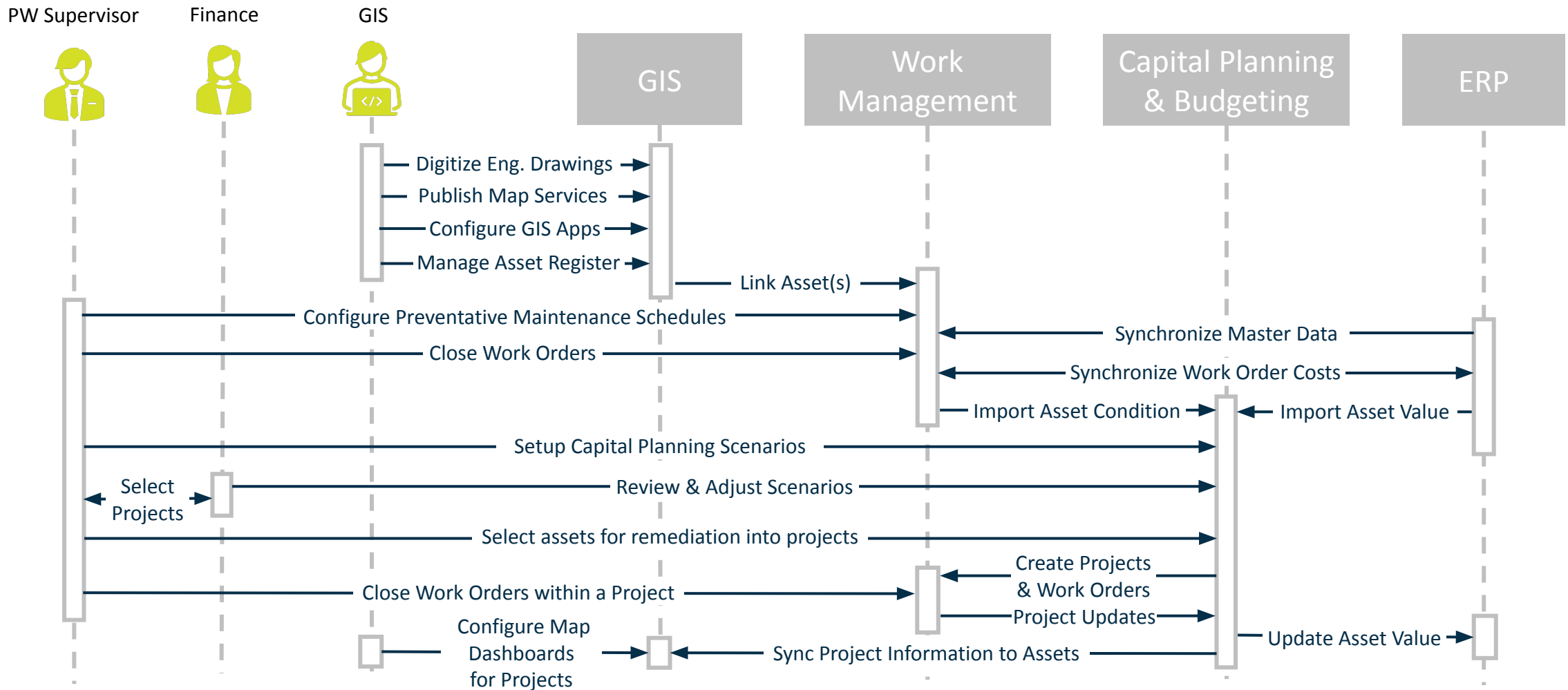
Ideal Process – Service Request + Work Orders



Ideal Process – Road Patrol + Fleet Operations



Ideal Process – Asset Register + Capital Planning



Esri Solutions

Esri has built a series of solutions on the ArcGIS Platform to enable the entire workflow from citizen service requests (Citizen Problem Reporter) through to management of work in the field (Workforce).

Data capture with Field Maps and QuickCapture enable fieldworkers to inspect, capture work details, log deficiencies, and work in online or offline modes.

ArcGIS Dashboards tie all solutions together with unified dashboard reporting on all aspects of work – from intake through completion.



Citizen Problem Reporter

Service Request Portal optimized for desktop or mobile to capture Citizen Service Requests



Workforce

Mobile and Desktop **Work Management** application to view, assign, distribute, and report on work



Field Maps

Field App on mobile to capture geographic features, perform inspections and work orders



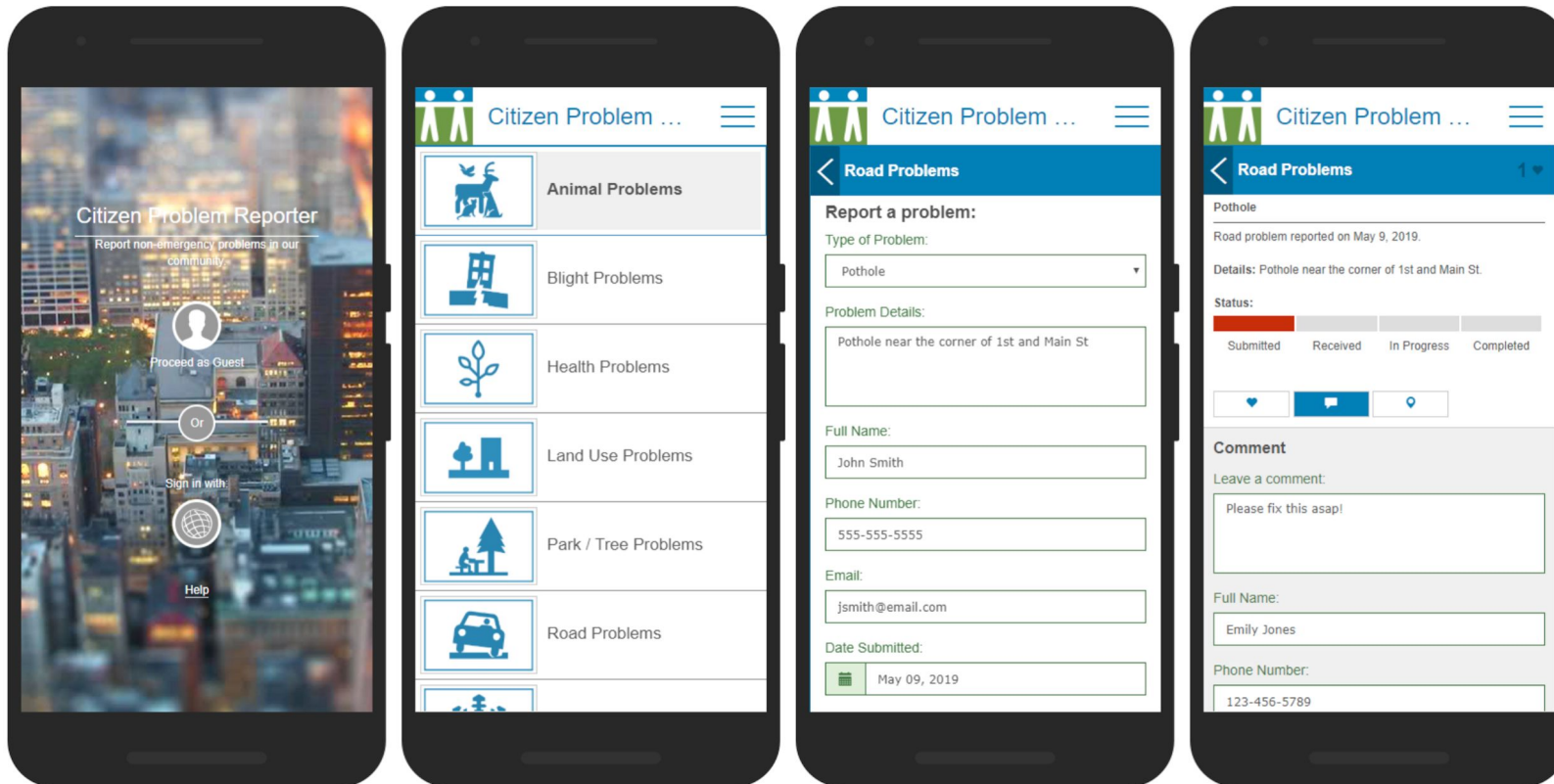
QuickCapture

Capture deficiency reports by location for **Road Patrol** and other vehicle-based data collection



Citizen Problem Reporter – LOG

Service Request
Portal



Log a Request

The Citizen Problem Reporter can be used to submit non-emergency problems. Select a problem category and review a map or list of existing problems that have already been reported. Comment on, or "like", existing reports. Anonymously submit a new problem report and provide details.



Citizen Problem Reporter - RESPOND

Service Request
Portal

The screenshot displays the 'Citizen Problem Manager' interface. At the top, there's a navigation bar with a home icon, the title 'Citizen Problem Manager', and a 'Sign In' button. Below this is a table of reported problems. The table has columns for Category, Type of Problem, Visible to the public, Status, Submitted On, and Full Name. Below the table, there are tabs for 'Details' and 'Comments (0)'. The 'Details' tab is active, showing fields for 'Visible to the public' (set to 'Yes'), 'Status' (set to 'In Progress'), 'Assigned To' (set to 'Public Works'), and 'Resolved On'. To the right of the details is a map of Naperville, IL, with various colored markers indicating the locations of reported problems.

Category	Type of Problem	Visible to the public	Status	Submitted On	Full Name
Road	Pothole	Yes	Submitted	May 09, 2019	John Smith
Land Use	Illegal Outdoor Sales	Yes	Submitted	May 07, 2019	Ashley Mac
Utility	Water Quality - Taste	Yes	Submitted	May 06, 2019	David Garb
Blight	Abandoned Vehicle	Yes	In Progress	May 06, 2019	Aurora Hen
Blight	Abandoned Vehicle	Yes	Received	May 06, 2019	Jocelyn Ree
Blight	Dilapidated Building	Yes	Completed	May 06, 2019	Jamal Baxte
Animal	Barking or Noisy Dog	Yes	Received	May 06, 2019	Jair Butler
Animal	Rodent Activity	Yes	In Progress	May 06, 2019	Amani And



Respond to Requests

Getting the general public through the “right” door is the first step to providing a consistent customer experience. Location-enabled problem reports helps efficiently triage the report to the correct person or department responsible for its resolution.



Citizen Problem Reporter - SURVEY

Service Request
Portal

Citizen Problem Manager

Category	Type of Problem	Visible to the public	Status	Submitted
Road	Pothole	Yes	Completed	May 09
Land Use	Illegal Outdoor Sales	Yes	Submitted	May 07
Utility	Water Quality - Taste	Yes	Submitted	May 06
Blight	Abandoned Vehicle	Yes	In Progress	May 06
Blight	Abandoned Vehicle	Yes	Received	May 06
Blight	Dilapidated Building	Yes	Completed	May 06
Animal	Barking or Noisy Dog	Yes	Received	May 06
Animal	Rodent Activity	Yes	In Progress	May 06

Details Comments (0)

Status: Submitted Received In Progress **Completed**

Assigned To: Public Works
Resolved On: 5/17/2019
Resolution Time: 7 days
Resolution: Repaired pothole

[Send Satisfaction Survey](#)

Citizen Problem Satisfaction Sur...

Your feedback is important to us. Please take a moment to complete this survey about your experience.

How satisfied were you with the resolution to your problem report?

- Very dissatisfied
- Somewhat dissatisfied
- Neutral
- Somewhat satisfied
- Very satisfied

How much time did it take us to address your problem report?

- Much longer than expected



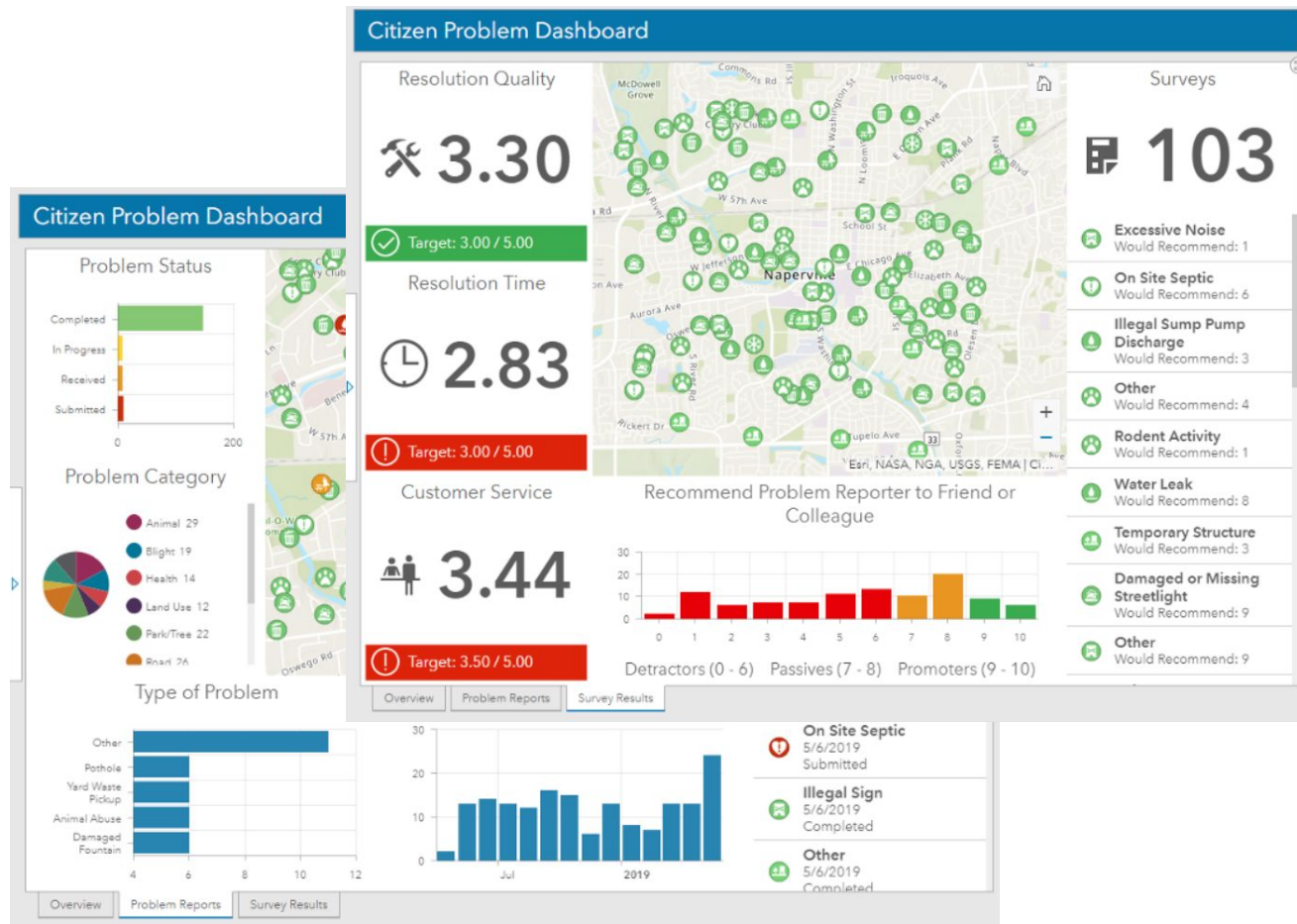
Collect Citizen Satisfaction

The Citizen Problem Satisfaction Survey can be used by operations managers to solicit feedback or satisfaction with the Town's resolution of a problem report. Using Citizen Problem Manager, mark the status "Completed" and send a survey to the individual that reported the problem.



Citizen Problem Reporter - MONITOR

Service Request
Portal



Monitor Reports

The Citizen Problem Dashboard can be used by operations managers and executives to monitor non-emergency problem reports submitted by the general public. Relevant metrics can be viewed at a glance or examined in more detail if time permits.



Citizen Problem Reporter – REQUIREMENTS

- Survey 123 Connect and ArcGIS Online or ArcGIS Enterprise are required to support the Citizen Problem Reporter and Citizen Problem Manager
- Citizen Problem Manager can be integrated to a Work Management System to support the allocation of problem requests to work orders
- Work order status changes and comments can be reported to the Citizen Problem Manager through an integration with a Work Management System

Survey 123

ArcGIS
Online

ArcGIS Hub

ArcGIS
Dashboard

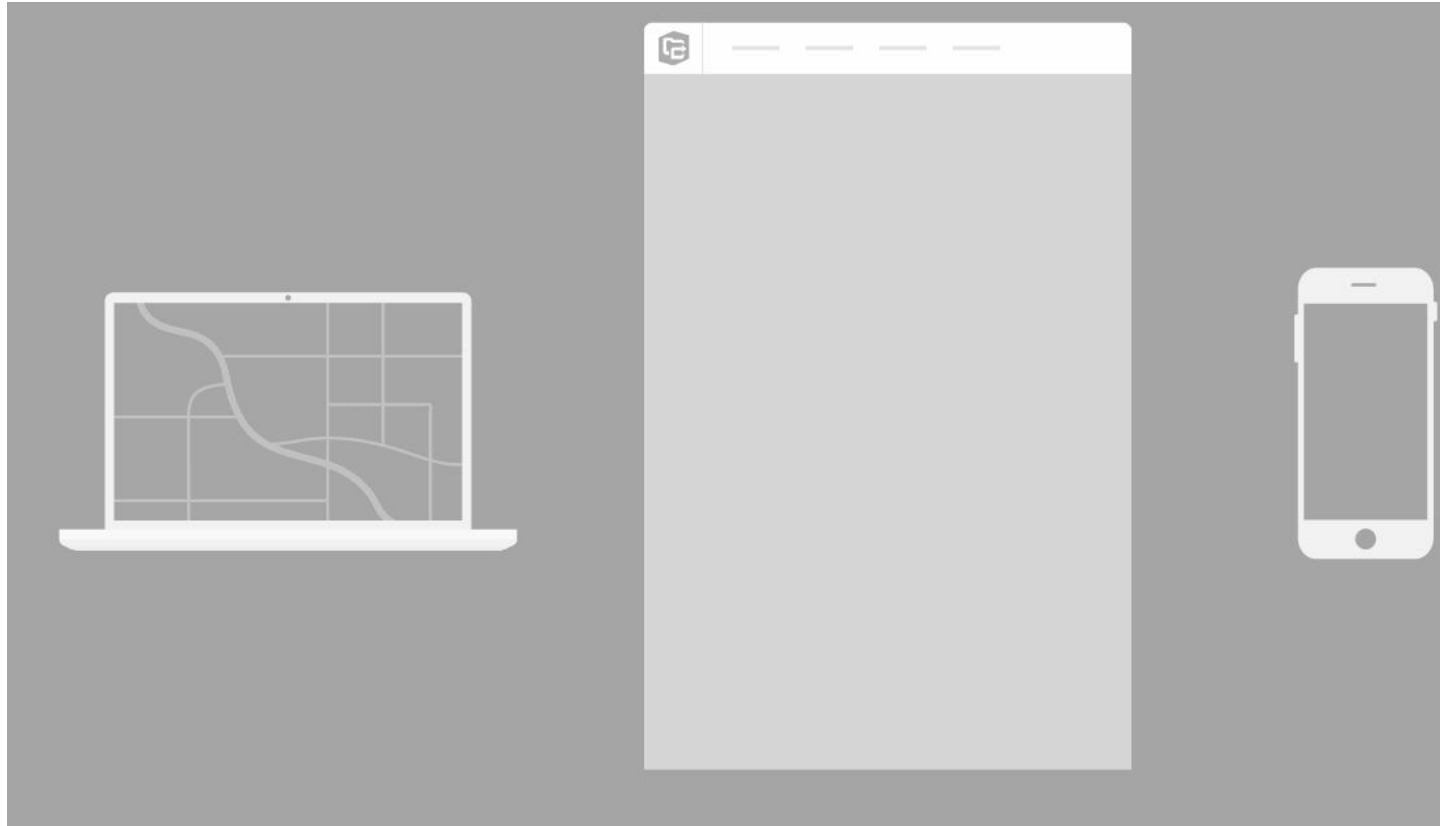
Application Requirements

Crowdsource Reporter and Crowdsource Manager are the application templates upon which the Citizen Problem Reporter is built.



Workforce – COLLABORATE

Work / Asset
Management



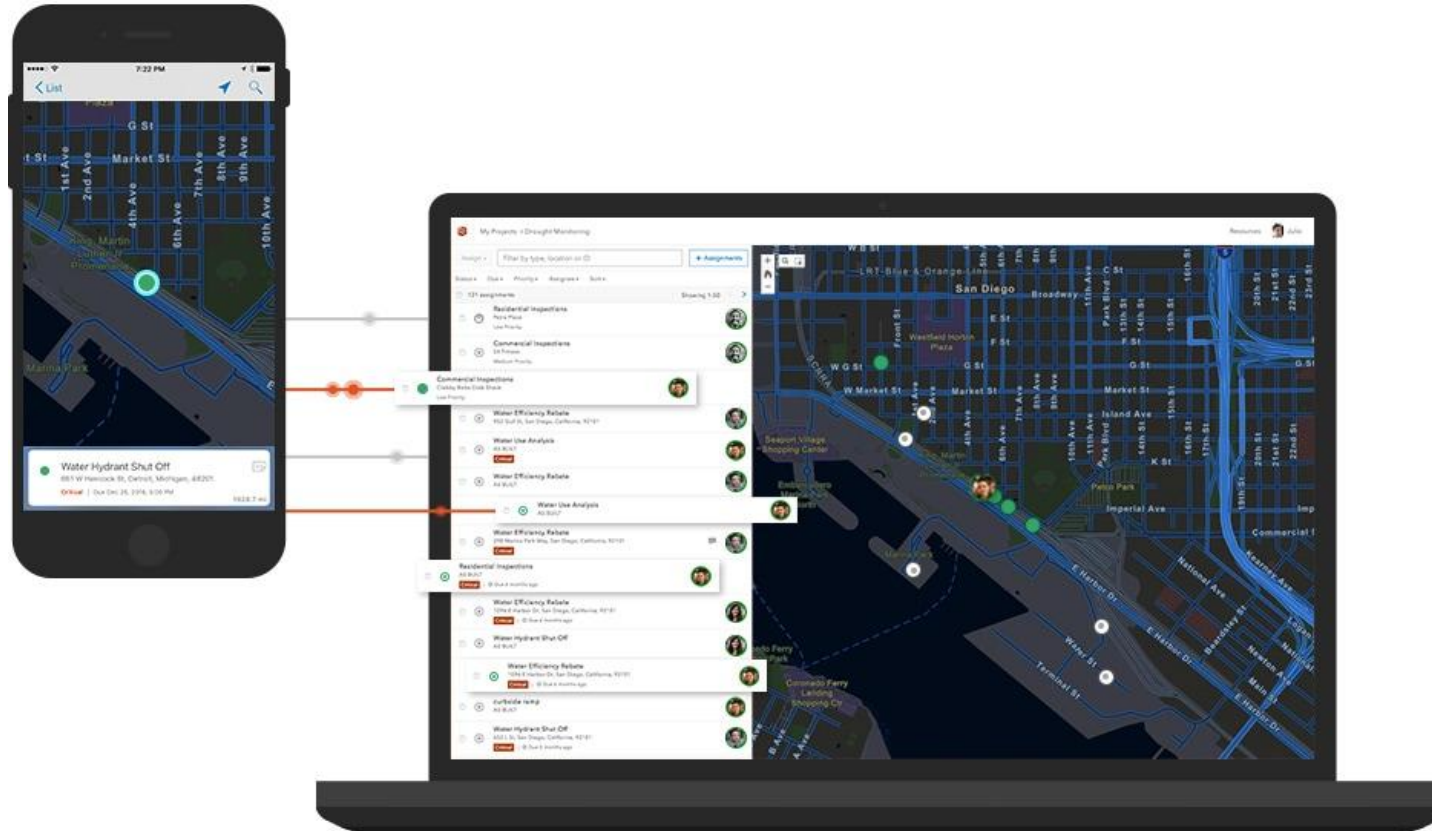
Common View of Work

A common view of all work information and location shared by fieldworkers and back office. Work assignments, current status, and fieldworker location is visible. Fieldworker location is hidden when on break or off shift.



Workforce - ASSIGN

Work / Asset
Management



Streamlined Work Assignments

Streamline the process of managing and assigning field work. Fieldwork projects are created and distributed into discrete assignments. Then, fieldworkers receive and report on assignments through mobile devices.



Workforce – STATUS

Work / Asset
Management

The screenshot displays a 'My Projects' dashboard for 'Road Damage'. On the left, a list of 121 assignments is shown, including 'Damage Assessment' and 'Pothole Repair' tasks with their respective due dates and priorities. On the right, a map view shows the geographic distribution of these assignments, with green markers indicating task locations and worker icons showing who is assigned to each task.

Status	Due	Priority	Assignee	Sort
<input type="checkbox"/>		High Priority	[Worker Icon]	
<input type="checkbox"/>		High Priority	[Worker Icon]	
<input type="checkbox"/>		High Priority	[Worker Icon]	
<input type="checkbox"/>		Critical	[Worker Icon]	
<input type="checkbox"/>		Critical	[Worker Icon]	
<input type="checkbox"/>		Critical	[Worker Icon]	
<input type="checkbox"/>		Critical	[Worker Icon]	
<input type="checkbox"/>		Critical	[Worker Icon]	
<input type="checkbox"/>		Critical	[Worker Icon]	
<input type="checkbox"/>		Medium Priority	[Worker Icon]	
<input type="checkbox"/>			[Worker Icon]	



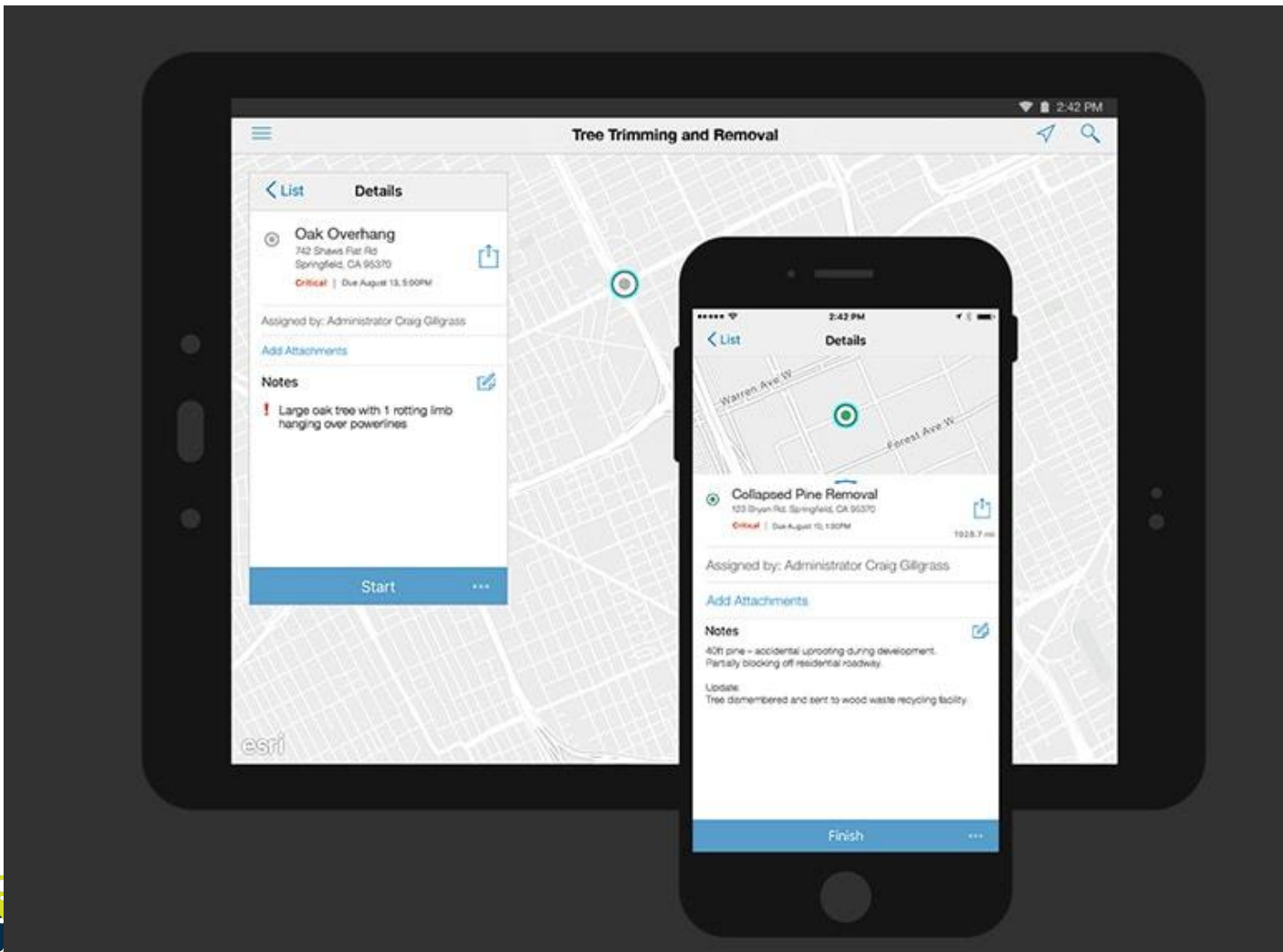
Realtime Awareness

Understand where work assignments are, who has been assigned, and when the work is completed. As field crews update work in their mobile devices, the assigned work is shown in the Workforce project dashboard.



Workforce - DISCONNECTED

Work / Asset
Management



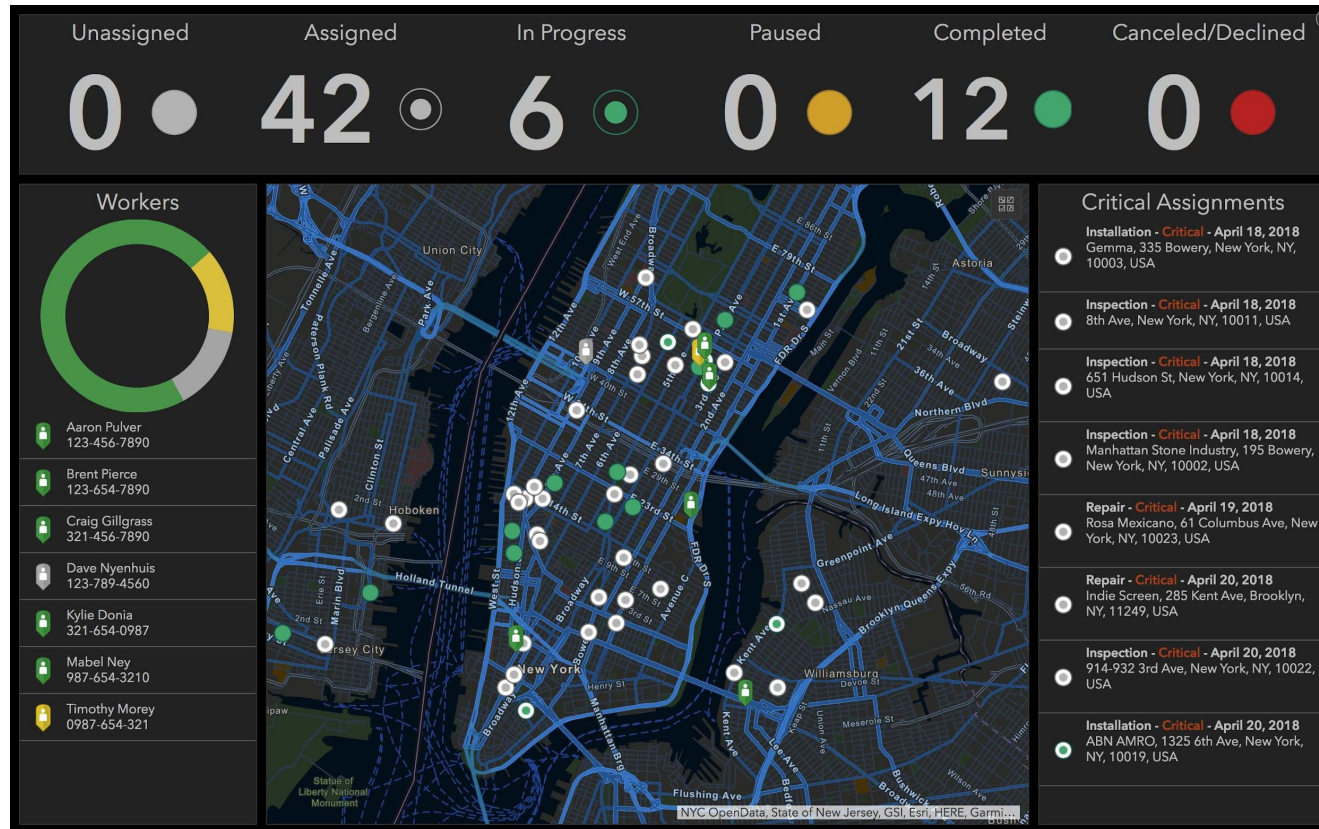
Disconnected Editing

Fieldworkers carry their maps and assignments on smartphones or tablets, making it easy and convenient for them to stay organized, report progress, call for assistance, and stay productive.



Workforce - REPORT

Work / Asset
Management



Workforce Project Dashboard

Leverage ArcGIS Operations Dashboard to provide visibility to supervisors and council on the currently assigned work and work status.



Workforce – REQUIREMENTS

Work / Asset
Management

- Workforce is an application template built on ArcGIS Online or ArcGIS Enterprise
- Workforce can be integrated with ArcGIS Field Maps to enable map- and form-driven workflows in the field by work type
- Workforce can be integrated with ArcGIS Citizen Problem Reporter through ArcGIS Online to retrieve citizen problem reports and coordinate status updates
- Workforce can also be integrated with a Work Management System to generate assignments and incorporate more sophisticated inspections and preventative maintenance schedules and workflows

Workforce
Project

ArcGIS
Online

Workforce
App

ArcGIS
Dashboard

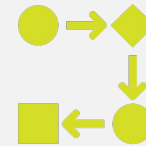
Application Requirements

Workforce is an application template built on ArcGIS 10.9. There is also a Workforce mobile app on Google Play or Apple Store for fieldworkers.



Field Maps - CAPTURE

Field App(s)



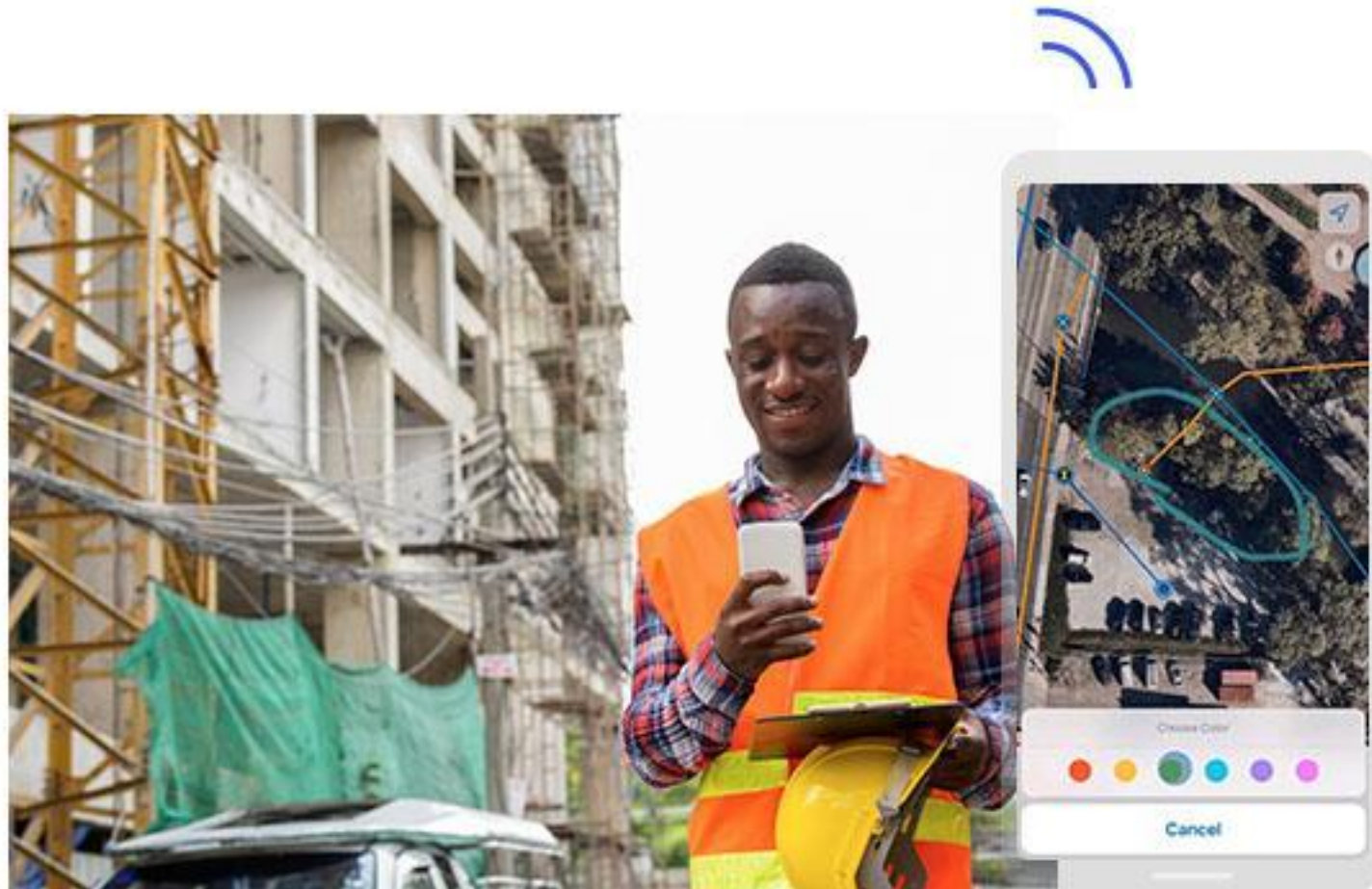
Streamline Field Workflows

Figure the specific workflows of your field workforce. Fieldworkers use the preconfigured field maps and forms they need on their mobile devices to efficiently and accurately complete their work.



Field Maps - MARKUP

Field App(s)



Add Notes & Markups

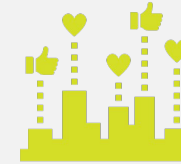
Fieldworkers can easily locate assets and data and even add markups and notes to document and share findings with others.

Maps are dynamic even in disconnected environments.



Field Maps - SHARE

Field App(s)



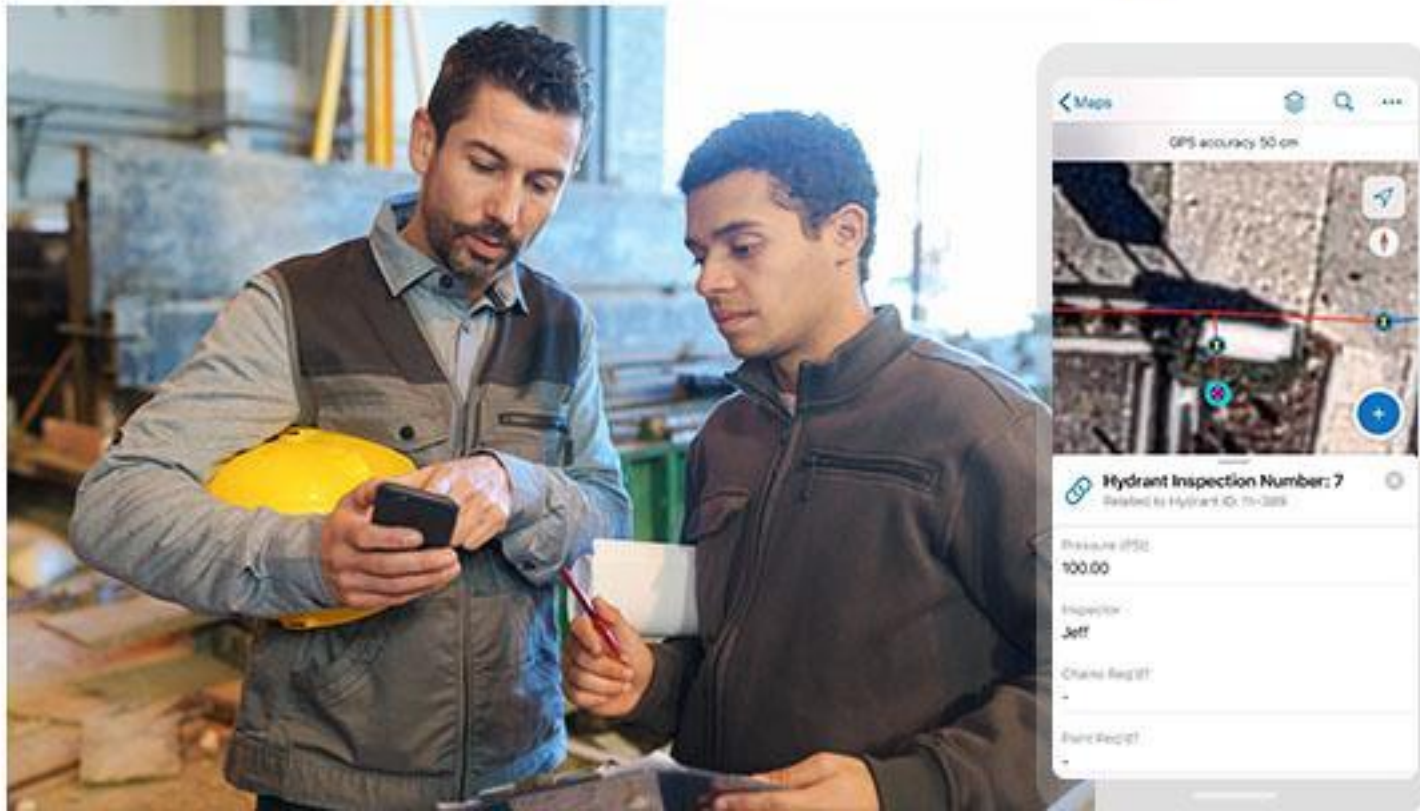
Access Data on Capture

greater accuracy when reporting data from the field by using a mobile data collection and editing app that avoids errors introduced from transcription, transfer, and other manual and paper-based processes. The captured or edited data is automatically accessible across the organization.



Field Maps - VERIFY

Field App(s)



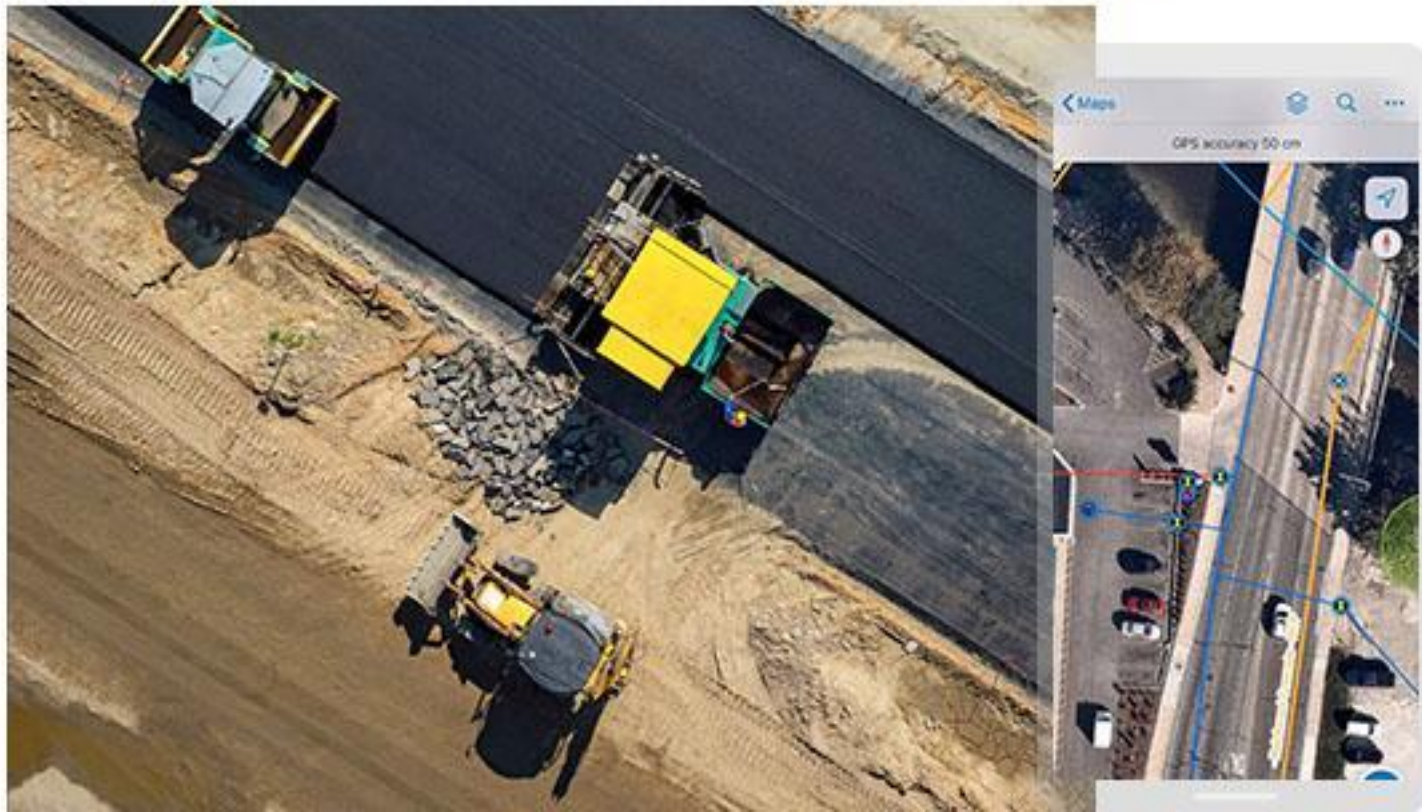
Verify When & Where

Confirm when and where work occurred. This is particularly useful when investigating claims for damage from potholes or other road deficiencies. All information is immediately available in maps.



Field Maps - DEPLOY

Field App(s)



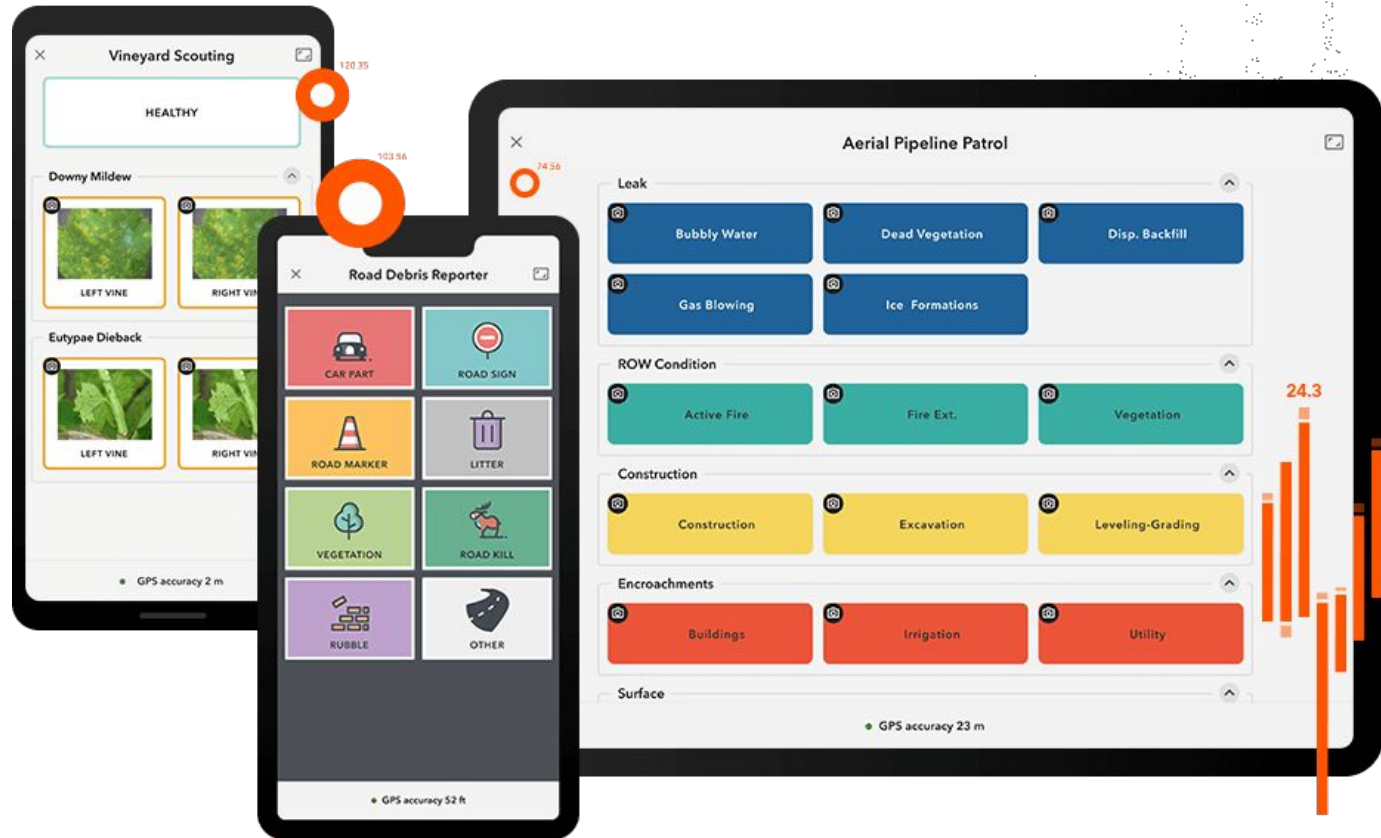
Deploy New Work Types & Process

New Work Types and context-sensitive forms are quickly deployed into the field with no need for fieldworkers to sync to a central system. Configure Work Types and process in ArcGIS Online.



QuickCapture - DESIGN

Road
Patrol



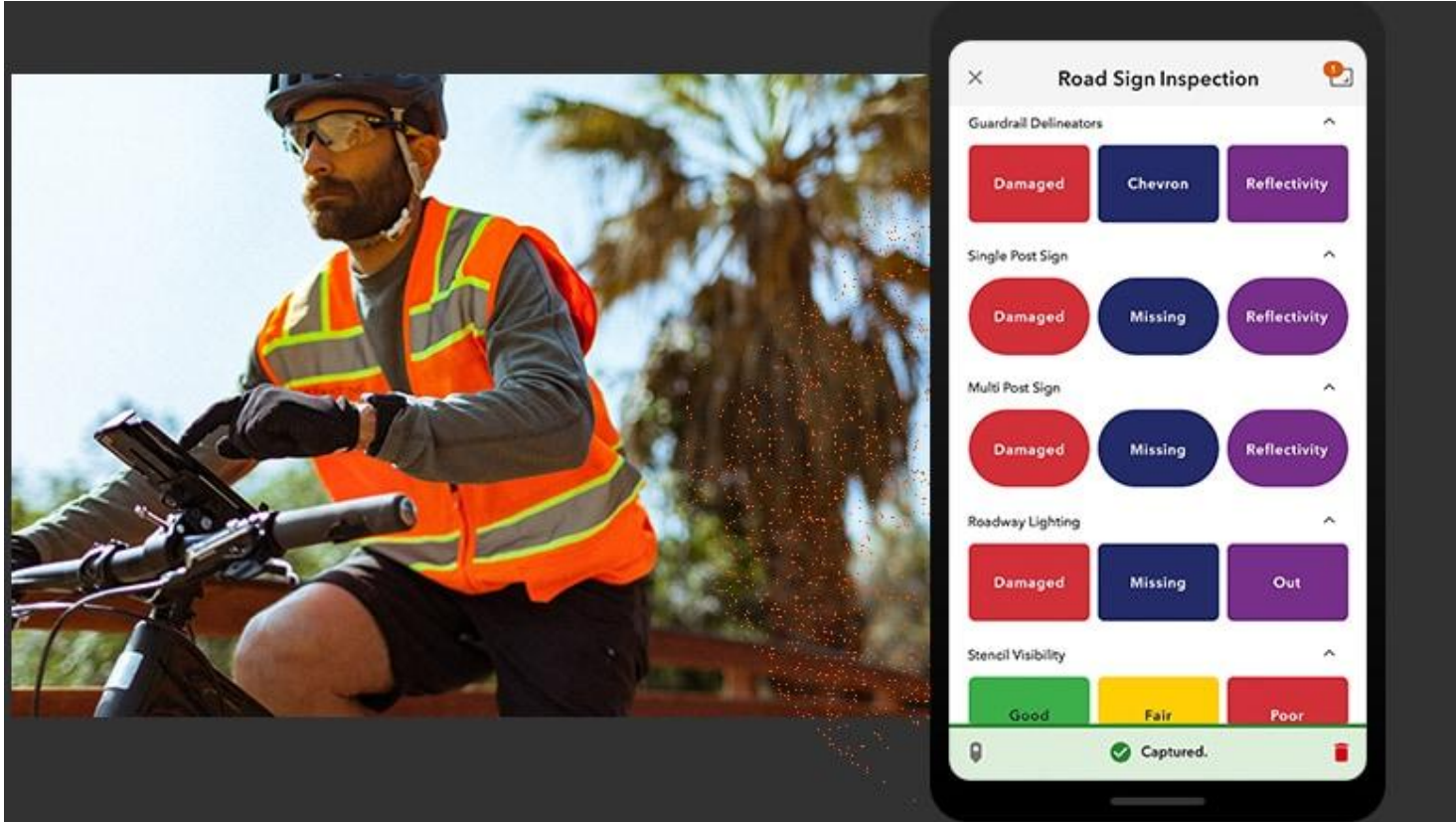
Design Vehicle-Based Data Capture

Design vehicle-based inspection workflows such as Road Patrol to capture locations, field conditions, and even photos quickly while operating a vehicle or bike. Sync with your back-office in real-time and eliminate time spent manually processing handwritten notes.



QuickCapture - COLLECT

Road
Patrol



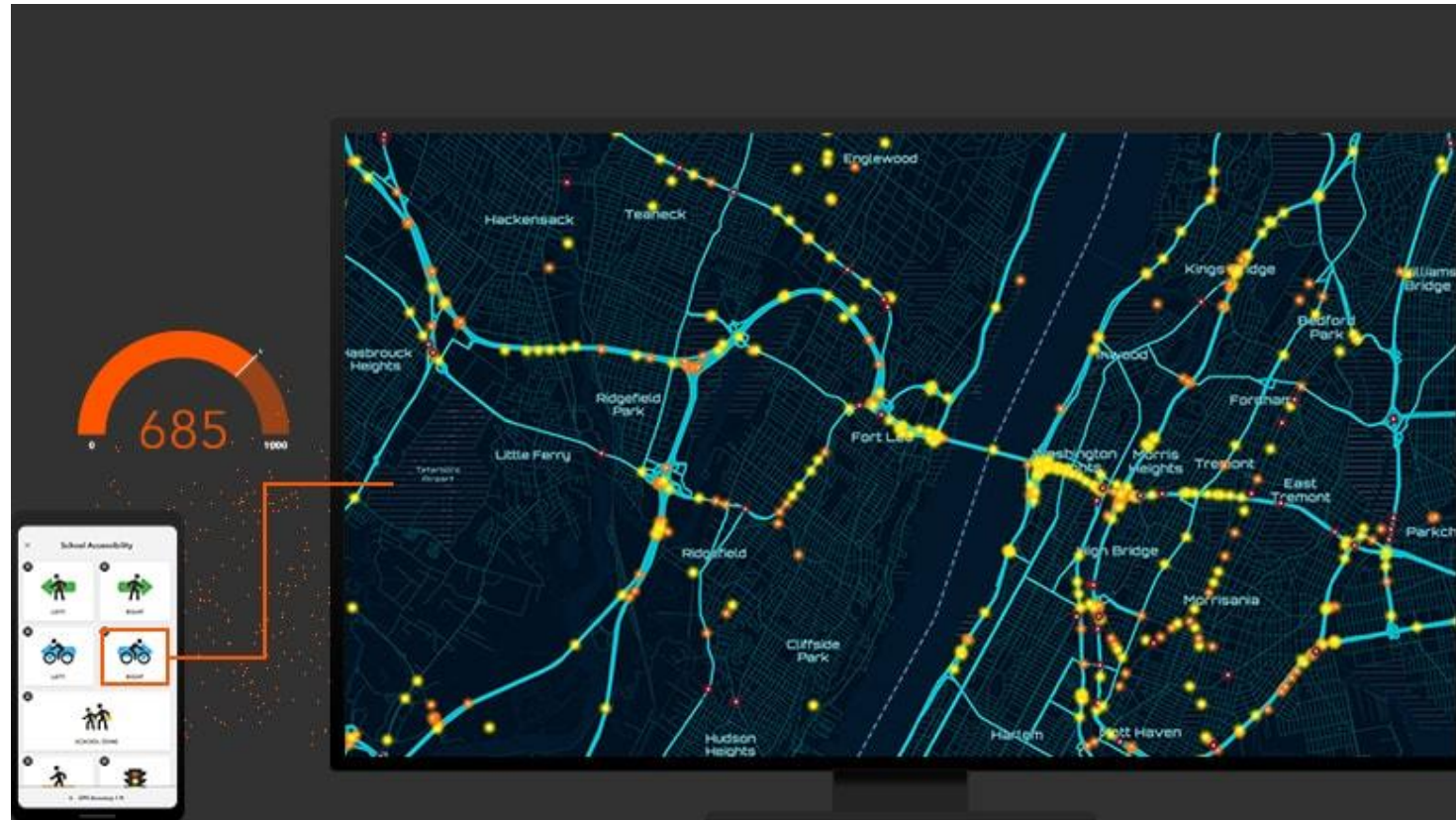
Collect Data

While in a moving vehicle, open the app and tap a button to per deficiency. No time is spent writing notes or finding GPS coordinates—the app knows where users are.



QuickCapture - ANALYSE

Road
Patrol



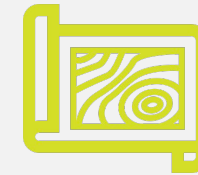
Analyse Data

Evaluate Road Patrol data by street segment and generate work orders by deficiency. Select deficiencies to group into work orders and integrate into your work management application.



ArcGIS Online – MAPS

GIS



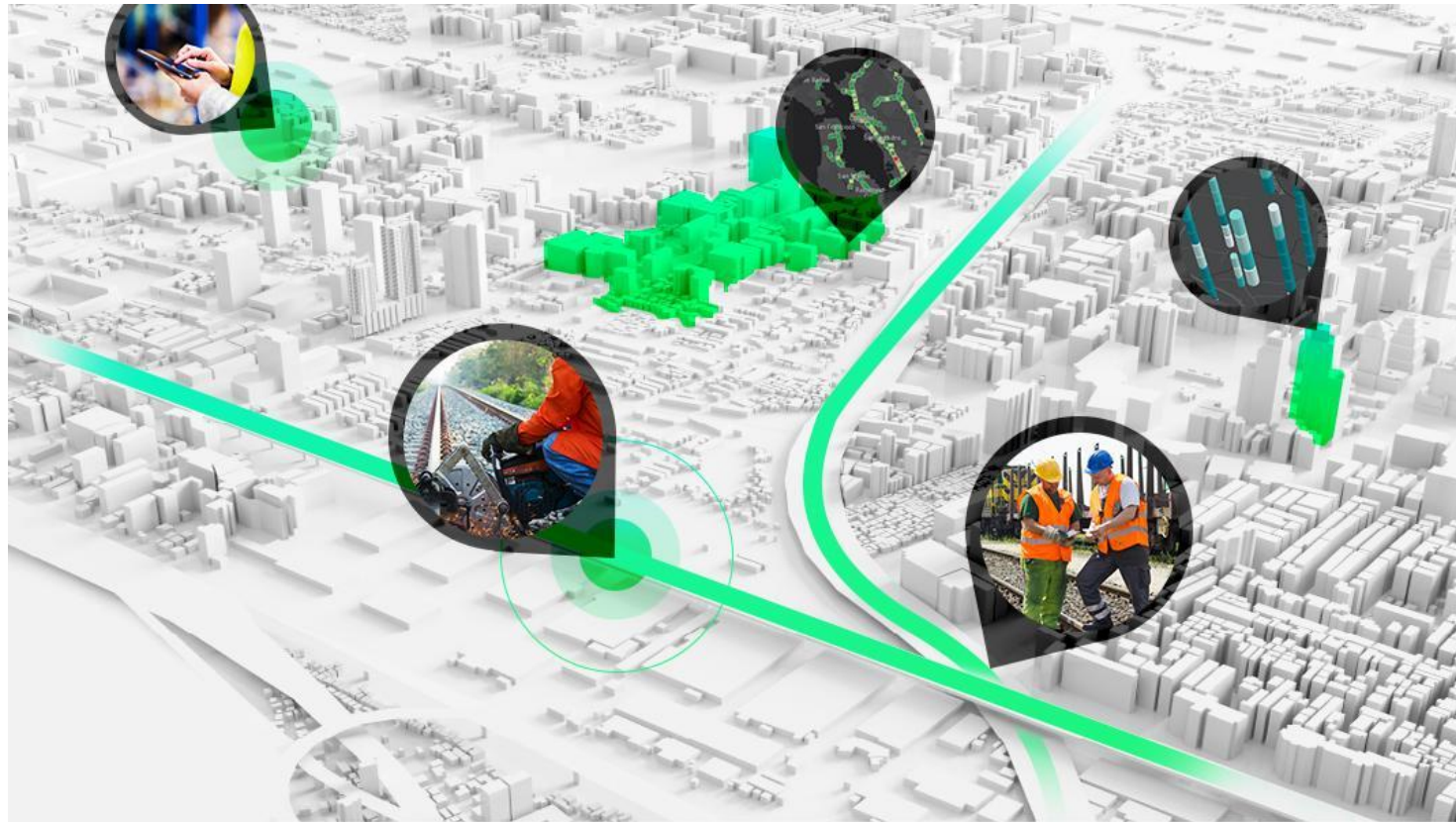
Make Maps

Share your maps with specific groups or everyone. Create web apps with your maps for a focused, interactive experience.



ArcGIS Online – ASSETS

GIS



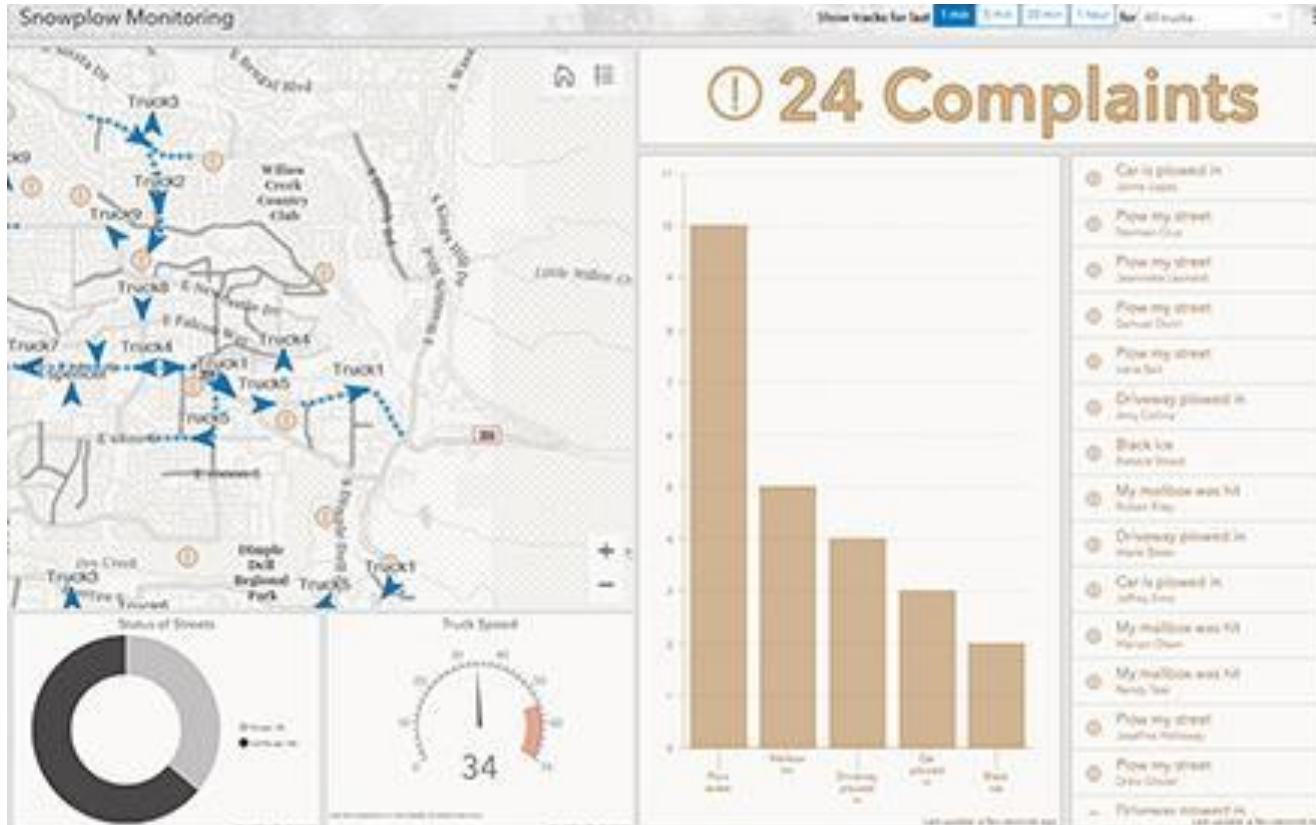
Manage Field Activities on Assets

Improve coordination and operational efficiency in workforce activities. Replace paper, modernize workflows for reliable and accessible data, and access the power of location anywhere



ArcGIS Online – DASHBOARDS

GIS



Interactive Dashboards

Map-based dashboards that incorporate location feeds, map data, and your business data and key performance indicators can be visualized and enable users to drill down into any level of detail.

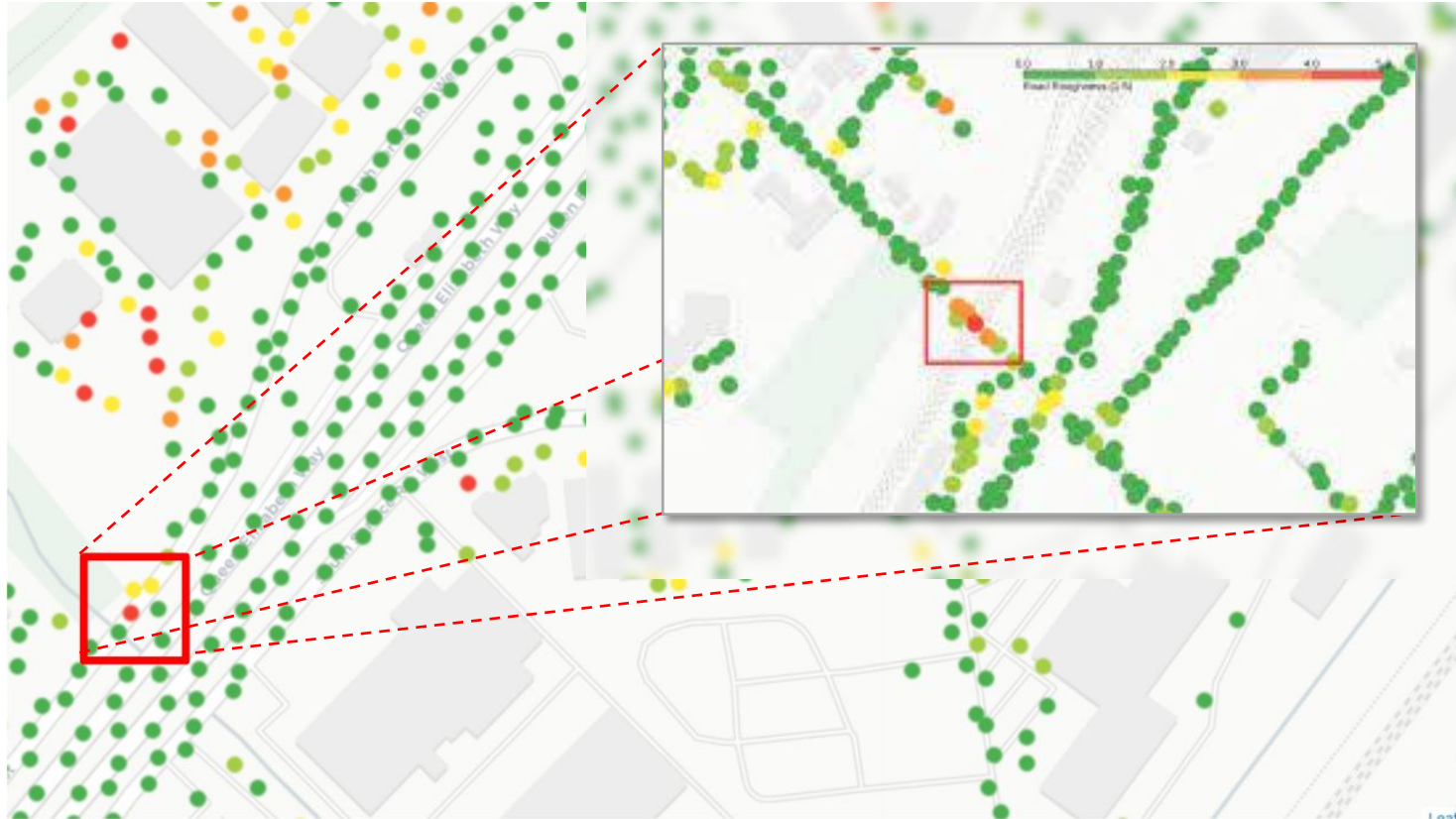


A person in a light-colored shirt and dark pants stands on a dark staircase, looking out over a city skyline at night. The scene is overlaid with a network diagram of nodes and lines. The background is a deep blue with a cityscape silhouette.

Solution Architecture

Service Request Portal. Work Management. Maps & Asset Register. Mobile + Fleet.

GeoTab Road Impediment Data

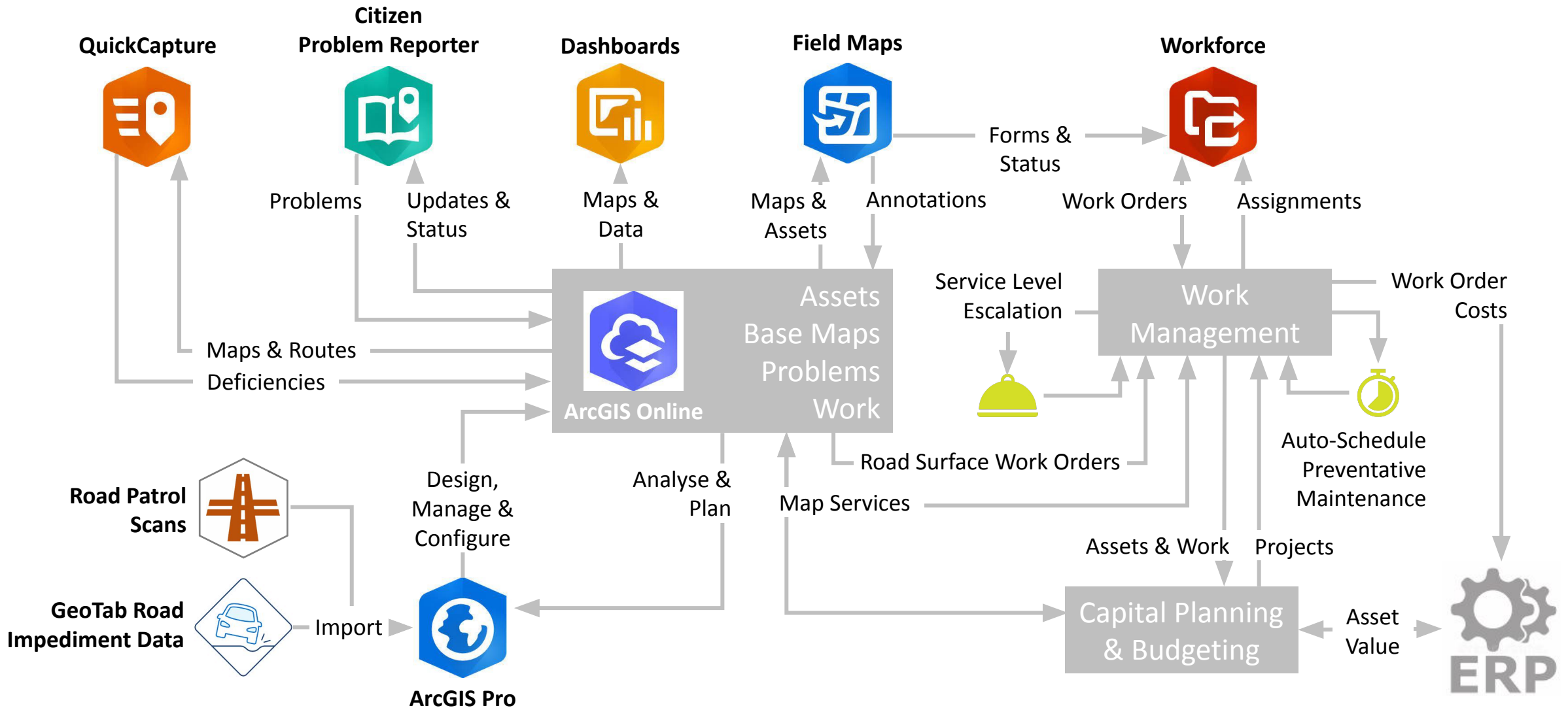


Road Impediment Data

GeoTab devices installed in commercial trucks and Town vehicles contain accelerometers and are constantly reporting road roughness, drop-offs, potholes, and other issues. Available Monthly.



Solution Architecture



Summary

The overall process for citizen service request and work management can be completely digitized, reducing reliance on paper and providing visibility on work activities to staff, citizens, and council.

Esri provides a number of apps and templates built on their mobile tools or ArcGIS to digitize and simplify service requests, field work, and reporting.

The Town will need a cloud-based work management system that supports preventative maintenance schedules and service-level escalation and assignment workflows to enable digitization of the full process.



People



Process



Technology

ROADMAP Initiatives.

Identify outcomes achieved through a series of initiatives

Create action plans to realize each initiative

Prioritize initiatives into a schedule with cost estimates



People



Process



Technology

A
G
E
N
D
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Project Overview

Outcomes

Initiatives & Action Plans

Timeline

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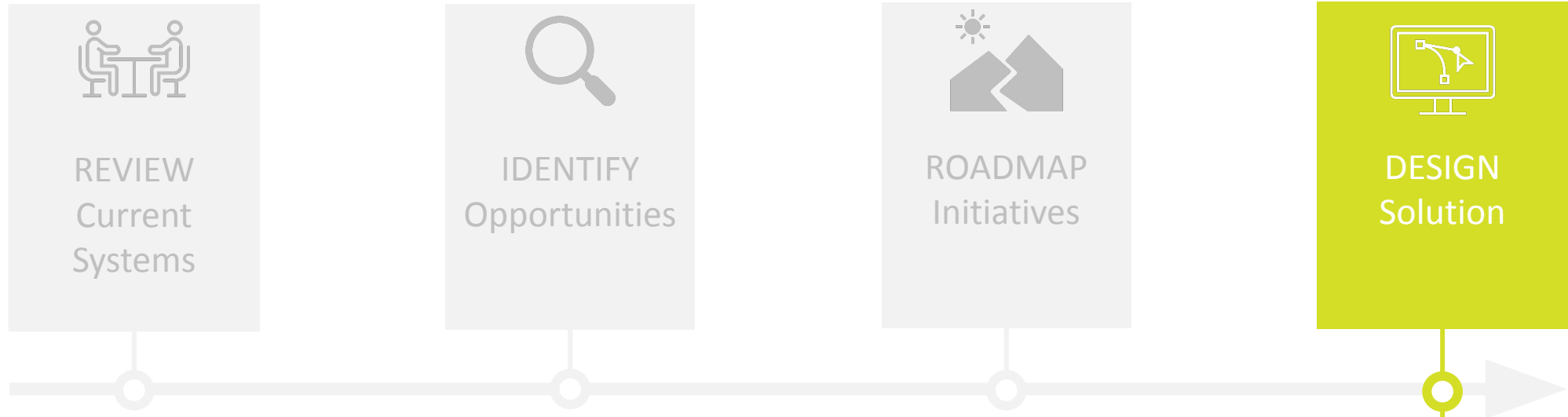
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- Decompose initiatives into a set of action steps to form action plans to achieve each outcome defined for the initiative
- Prioritize initiatives and provide a budgetary estimate for each
- Organize initiatives and action plans into a high-level schedule that fits the budget expectations for the Town



Project Overview - DESIGN



- Design the technical architecture that outlines all of the major systems and the integrations between
- List the modules and services in the Esri ArcGIS Platform to license to support all capabilities identified
- Identify the customization requirements for the Esri ArcGIS Platform to fully deliver the identified capabilities
- Specify the data exchange requirements and integration workflows between systems
- Generate an overall listing of use cases and requirements that define the solution architecture



A person in a light-colored shirt and dark pants stands on a dark staircase, reaching out with their right hand towards a bright light source. The background is a dark blue gradient with faint geometric patterns and a cityscape silhouette. The overall mood is one of aspiration and progress.

Outcomes

Digital Transformation of Service Request to Field Completion Work Processes

List of Identified Opportunities

1. Citizen service request portal:

- a. ArcGIS Citizen Problem Reporter
- b. ArcGIS Citizen Problem Manager

2. Road patrol tools:

- c. ArcGIS QuickCapture
- d. Road scanner data & analysis
- e. GeoTab Road Impediments Data

3. Maps, Assets, Reporting:

- f. Manage assets in ArcGIS Online
- g. Reports with ArcGIS Dashboards
- h. Visualize fleet operations

4. Work Management:

- a. Preventative maintenance schedules
- b. Link work to assets
- c. Capture vehicle maintenance metrics from GeoTab and generate vehicle work
- d. Capture work order costs (labour, material, equipment usage)
- e. Capital planning
- f. Level of service by work type

5. Fieldwork applications:

- g. ArcGIS Field Maps
- h. ArcGIS Workforce



Outcomes



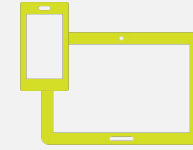
Goodbye Paper Processes

The entire request to field completion process and SLA escalations are captured digitally



Responsive to Citizens

Citizens report through one process and can receive regular updates on progress and status.



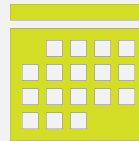
Fieldworkers Go Digital

Fieldwork is assigned digitally, and mobile devices collect notes, costs, asset condition, and work status



Work Associated to Assets

An asset register stores infrastructure, facility, fleet, and natural assets to which work is linked



Preventative Maintenance Schedule

Preventative maintenance schedules are associated to all infrastructure, equipment, and vehicles



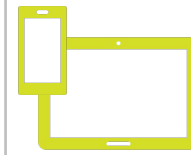
Transparent Reporting

Managers and council have dashboard reports on citizen reports and all work activities.



Opportunities:

Outcomes:



1a. ArcGIS Citizen Problem Reporter

✓

✓

1b. ArcGIS Citizen Problem Manager

✓

✓

2a. ArcGIS QuickCapture

✓

✓

2b. Road scanner data & analytics

✓

✓

2c. GeoTab Road Impediment Data

✓

✓

3a. Manage assets in ArcGIS Online

✓

✓

✓

3b. Reports with ArcGIS Dashboards

✓

✓

✓

3c. Visualize fleet operations

✓

✓

4a. Preventative maintenance

✓

✓

✓

4b. Link work to assets

✓

✓

✓

4c. Capture vehicle operation metrics

✓

✓

4d. Capture work order costs

✓

✓

4e. Capital planning

✓

✓

4f. Level of service by work type

✓

✓

5a. ArcGIS Field Maps

✓

✓

✓

5b. ArcGIS Workforce

✓

✓

✓

✓

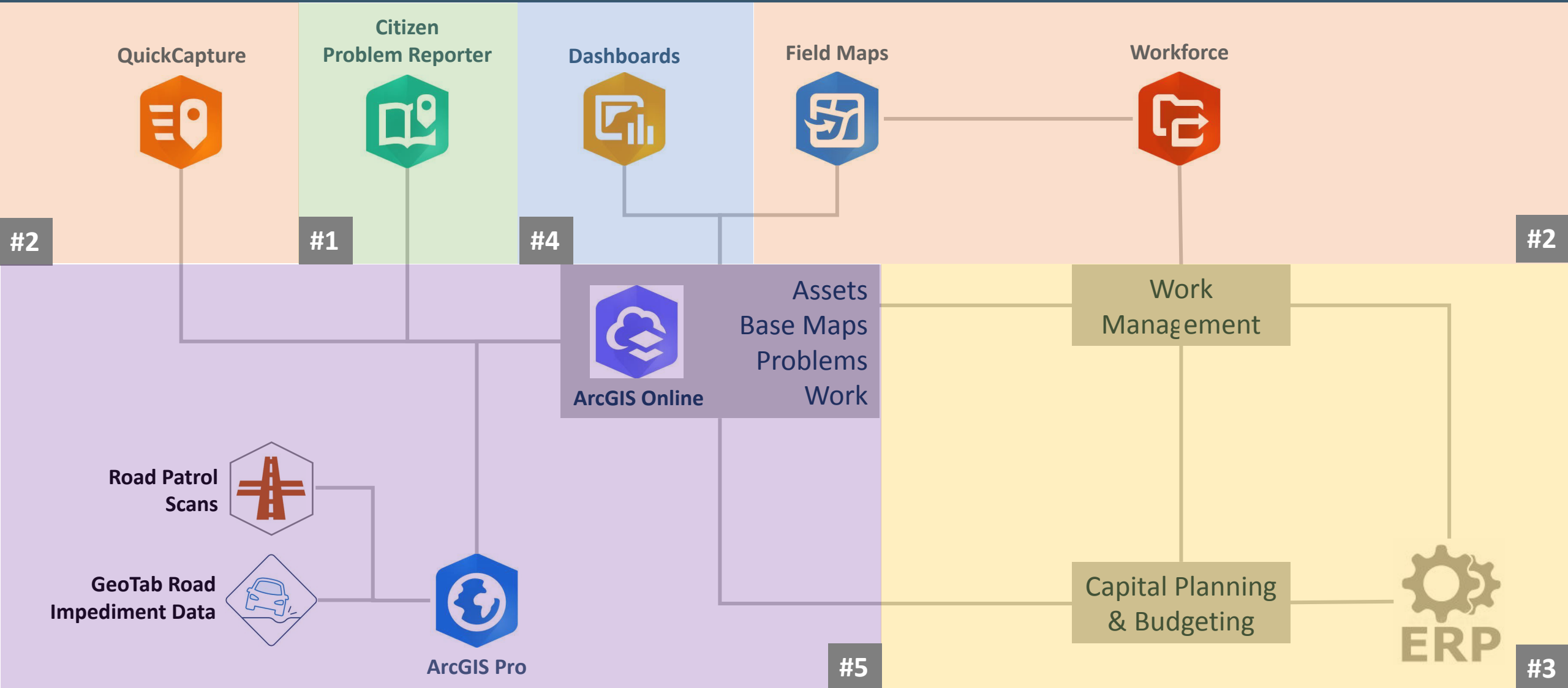


A person in a light-colored shirt and dark pants stands on a dark staircase, viewed from behind. They are pointing their right hand towards a city skyline at night. The background is a dark blue gradient with a network diagram of white dots and lines. The overall scene is dimly lit, with the city lights providing a subtle glow.

Initiatives & Action Plans

Service Request Portal. Mobile for Fieldwork. Work & Capital Planning. Reporting.

Solution Architecture Divided into Initiatives



List of Initiatives and Technologies



1 Replace Service Request Portal

2 Deploy Mobile Fieldworker Tools

QuickCapture



Field Maps



Workforce



3 Implement Work & Capital Planning Solution

Work Management

Capital Planning & Budgeting

4 Build Map-Based Dashboards to Visualize Work

Dashboards



5 Setup GIS Operations & System Support

ArcGIS Online



ArcGIS Pro



GeoTab



Road Scans



#1 Replace Service Request Portal

- Leverage ArcGIS Citizen Problem Reporter & Manager to digitally capture citizen problem requests, and associate to assets where appropriate.
- Citizen Problem Reporter also enables upload of photos, notes, and allows for subscription to existing problems.
- Configure IVR solution to ensure one mechanism to call into a call coordinator for all issues. Call coordinator enters citizen service requests into Citizen Problem Reporter.
- Field staff can report changes to status of reported problems. They can also enter private (internal) or public (subscribers to problem) notes to communicate more details.



#1 AP: Replace Service Request Portal

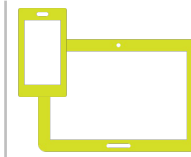
Roadmap	Number	Action Steps
\$35,000	1a	Create a set of 3-6 categories based on location or asset type that a citizen may report. Build a 1-3 level hierarchy of work types below the category that enables drill-down to a problem a citizen can report without too much detail.
	1b	Build a prototype app and service for 1 category of problems. Invite a small set of users to test out and comment on issues or shortcomings.
	1c	Configure one workflow and supporting map service per problem type.
\$5,000	1d	Create the roundtrip communication from Field Maps / Workforce to Citizen Problem Reporter of public comments and changes to status.
	1e	Negotiate Service Level Agreements per problem type
\$5,000	1f	Configure work management system to escalate service requests and associated work orders based on negotiated Service Level Agreements.

Timeframe (months): 2022 2023 2024

Outcomes:      

Opportunities:

Outcomes:



1a. ArcGIS Citizen Problem Reporter

✓

✓

✓

1b. ArcGIS Citizen Problem Manager

✓

✓

2a. ArcGIS QuickCapture

✓

✓

2b. Road scanner data & analytics

✓

✓

2c. GeoTab Road Impediment Data

✓

✓

3a. Manage assets in ArcGIS Online

✓

✓

✓

3b. Reports with ArcGIS Dashboards

✓

✓

✓

3c. Visualize fleet operations

✓

✓

4a. Preventative maintenance

✓

✓

✓

4b. Link work to assets

✓

✓

✓

4c. Capture vehicle operation metrics

✓

✓

4d. Capture work order costs

✓

✓

4e. Capital planning

✓

✓

4f. Level of service by work type

✓

✓

5a. ArcGIS Field Maps

✓

✓

✓

5b. ArcGIS Workforce

✓

✓

✓

✓



#2

Deploy Mobile Fieldwork Tools

- Simplify field-based workflows by provided a mobile app that allows for configuration of context-driven forms by work type AND attach location to all collected information.
- Digitally collecting inspection information and enabling staff to add notes and annotate work orders digitally, as well as change status or close will remove the need for paper work orders in the field.
- A light-weight field workforce management tool will allow supervisors to know where fieldworkers are deployed, assign or monitor tasks and progress, and provide map-based planning for projects and preventative maintenance.
- Integration of the workforce management app with a work management system enables the automated assignment of preventative maintenance and work based on team-based workflows.
- The tools identified to support mobile fieldwork are ArcGIS Field Maps, ArcGIS Workforce, ArcGIS Online, and the new cloud-based work management system.



#2

AP: Deploy Mobile Fieldwork Tools

Roadmap	Number	Action Steps
\$30,000	2a	Create a complete asset registry in ArcGIS Online. Associate assets to geography where appropriate, or link to geographic objects such as facilities. Iterate by asset class.
	2b	Build a prototype Workforce and Field Maps app and workflows for 1 asset class. Invite a small set of users to test out and comment on issues or shortcomings.
	2c	Develop workflows for each work type and asset class. Iterate by work type.
	2d	Configure and deploy ArcGIS QuickCapture for Road Patrol activities.
\$5,000	2e	Update Workforce and Field Maps workflows to include estimated material consumed, equipment usage, and labour effort.
\$10,000	2f	Integrate Workforce with Work Management System to automate the assignment of work, number of work orders, and receipt of preventative maintenance work orders.

Timeframe (months):

2022

2023

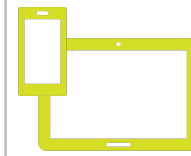
2024

Outcomes:



Opportunities:

Outcomes:



1a. ArcGIS Citizen Problem Reporter

✓

✓

✓

1b. ArcGIS Citizen Problem Manager

✓

✓

2a. ArcGIS QuickCapture

✓

✓

2b. Road scanner data & analytics

✓

✓

2c. GeoTab Road Impediment Data

✓

✓

3a. Manage assets in ArcGIS Online

✓

✓

✓

✓

3b. Reports with ArcGIS Dashboards

✓

✓

✓

3c. Visualize fleet operations

✓

✓

4a. Preventative maintenance

✓

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4b. Link work to assets

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4c. Capture vehicle operation metrics

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4d. Capture work order costs

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✓

4e. Capital planning

✓

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✓

4f. Level of service by work type

✓

✓

5a. ArcGIS Field Maps

✓

✓

✓

5b. ArcGIS Workforce

✓

✓

✓

✓



#3

Implement Work & Capital Planning Solution

- Purchase a new work and asset management solution that includes a capital planning and budget module. Any solution should be cloud-based to simplify infrastructure management. Ease of use and configuration is a paramount consideration.
- Both work and capital planning solutions should interface directly with ArcGIS Online to link geographic representations of assets where appropriate.
- Linear and areal infrastructure such as water, wastewater, streets, and parcels should maintain an asset genealogy (history of splits and merges) to enable historical work orders to reference the appropriate geographic representation.
- Preventative maintenance schedules enable the creation of work orders against assets to ensure that supplier-mandated upkeep is recorded and performed.
- A service request module configured to support escalation based on service-level agreements will support better responses to citizen service requests.
- Capital planning and budgeting supports various scenarios to meet a level of service for each asset class, leverage current asset condition and consideration of the asset lifecycle to recommend remediation or replacement.



#3

AP: Implement Work & Capital Planning Solution

Roadmap	Number	Action Steps
nil	3a	Interview suppliers and select a cloud-based work and asset management solution with capital planning and budgeting module.
\$140,000	3b	Configure Esri map services to support work & capital planning solution.
	3c	Design new work management and capital planning workflows.
	3d	Configure work and asset management system iteratively by asset class. Configure capital planning and budgeting module, including interfaces to ERP.
	3e	Integrate GeoTab vehicle maintenance measures and enable generation of fleet work orders.
	3f	Deploy work and capital planning solution to staff, iteratively by asset class.

Timeframe (months):

2022

2023

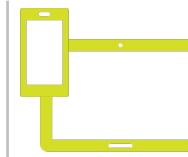
2024

Outcomes:



Opportunities:

Outcomes:



1a. ArcGIS Citizen Problem Reporter	✓	✓		✓		
1b. ArcGIS Citizen Problem Manager	✓	✓				
2a. ArcGIS QuickCapture	✓		✓			
2b. Road scanner data & analytics			✓		✓	
2c. GeoTab Road Impediment Data			✓		✓	
3a. Manage assets in ArcGIS Online	✓	✓	✓	✓		
3b. Reports with ArcGIS Dashboards	✓	✓				✓
3c. Visualize fleet operations		✓				✓
4a. Preventative maintenance	✓			✓	✓	
4b. Link work to assets	✓			✓		✓
4c. Capture vehicle operation metrics	✓			✓	✓	
4d. Capture work order costs	✓			✓		✓
4e. Capital planning	✓			✓		✓
4f. Level of service by work type		✓				✓
5a. ArcGIS Field Maps	✓		✓		✓	
5b. ArcGIS Workforce	✓		✓	✓	✓	



#4

Build Map-Based Dashboards to Visualize Work

- ArcGIS Dashboards enable the visualization of key performance metrics and styled maps based on service requests, planned or in-process work, and capital spending scenarios for various asset classes.
- Dashboards can be deployed to roll up information to supervisors and management, to summarize progress and status on key projects or performance metrics to Council, or to inform citizens about key aspects of project work in their Town.
- Interactive Dashboards enable the drill-down of trends into more detailed data that can provide additional insight or questions regarding Town issues.
- Transparency – in a word, Dashboards shine a light on the status of current and planned work and the performance of Town staff against service level targets.



#4

AP: Build Map-Based Dashboards to Visualize Work

Roadmap	Number	Action Steps
see 5a	4a	Configure a Dashboard showing service request numbers, resolutions, locations, and problem types, along with typical resolution times against service level agreements.
	4b	Create an ArcGIS Dashboard that shows plow and sanding progress on a live map from the GeoTab GPS feed.
	4c	Build a Dashboard showing the current work, work locations, status by work location (scheduled, started, completed), and completion times by work type.
see 5b	4d	Create a series of Dashboards for Capital Planning that compares various investment scenarios, displays assets on a map by asset class and condition, and show changes to infrastructure based on various remediation or replacement activities.

Timeframe (months):

2022

2023

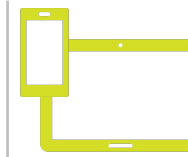
2024

Outcomes:



Opportunities:

Outcomes:



1a. ArcGIS Citizen Problem Reporter	✓	✓		✓		
1b. ArcGIS Citizen Problem Manager	✓	✓				
2a. ArcGIS QuickCapture	✓		✓			
2b. Road scanner data & analytics			✓		✓	
2c. GeoTab Road Impediment Data			✓		✓	
3a. Manage assets in ArcGIS Online	✓	✓	✓	✓		
3b. Reports with ArcGIS Dashboards	✓	✓				✓
3c. Visualize fleet operations		✓				✓
4a. Preventative maintenance	✓			✓	✓	
4b. Link work to assets	✓			✓		✓
4c. Capture vehicle operation metrics	✓			✓	✓	
4d. Capture work order costs	✓			✓		✓
4e. Capital planning	✓			✓		✓
4f. Level of service by work type		✓				✓
5a. ArcGIS Field Maps	✓		✓		✓	
5b. ArcGIS Workforce	✓		✓	✓	✓	



Setup GIS Operations & System Support

- GIS applications and data underpin the transition to the new solution architecture. Many of the Town's asset, including water/wastewater and road infrastructure are being digitized into GIS.
- By adding GIS applications to the portfolio of applications managed by the Town, there is a need for an additional GIS applications specialist position within the IT organization. GIS data management can continue within the Public Works purview.
- Additional analytics tasks supporting road patrol and resulting work order generation will add demands on the GIS data management role.
- Ongoing work that leverages external consultants to help in the digitization of assets and the inspection activities required to assess asset condition will make the data managed in ArcGIS Online and a new Work Management System more valuable.



#5

AP: Setup GIS Operations & System Support

Roadmap	Number	Action Steps
\$35,000	5a	Hire a consultant to provide the initial configuration of ArcGIS Online and related tools.
\$55,000	5b	Create a new position, GIS Applications Specialist, in the IT Department to support the GIS-based tools requiring configuration, workflow development, and maps.
\$80,000		
see 5a or 5b	5c	Develop a Wiki to store information on how various parts of the Solution Architecture are structured and configured and to provide user-level documentation and education to enable supervisors and other technically-able staff to iterate on work already done.
see 5b	5d	Build the analytical processes to consume road scan data and GeoTab Road Impediment Data to create remedial work orders for road surface improvements.

Timeframe (months):

2022

2023

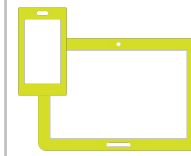
2024

Outcomes:



Opportunities:

Outcomes:



1a. ArcGIS Citizen Problem Reporter

✓

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1b. ArcGIS Citizen Problem Manager

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2a. ArcGIS QuickCapture

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2b. Road scanner data & analytics

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2c. GeoTab Road Impediment Data

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3a. Manage assets in ArcGIS Online

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3b. Reports with ArcGIS Dashboards

✓

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✓

3c. Visualize fleet operations

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4a. Preventative maintenance

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4b. Link work to assets

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4c. Capture vehicle operation metrics

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4d. Capture work order costs

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4e. Capital planning

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4f. Level of service by work type

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5a. ArcGIS Field Maps

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5b. ArcGIS Workforce

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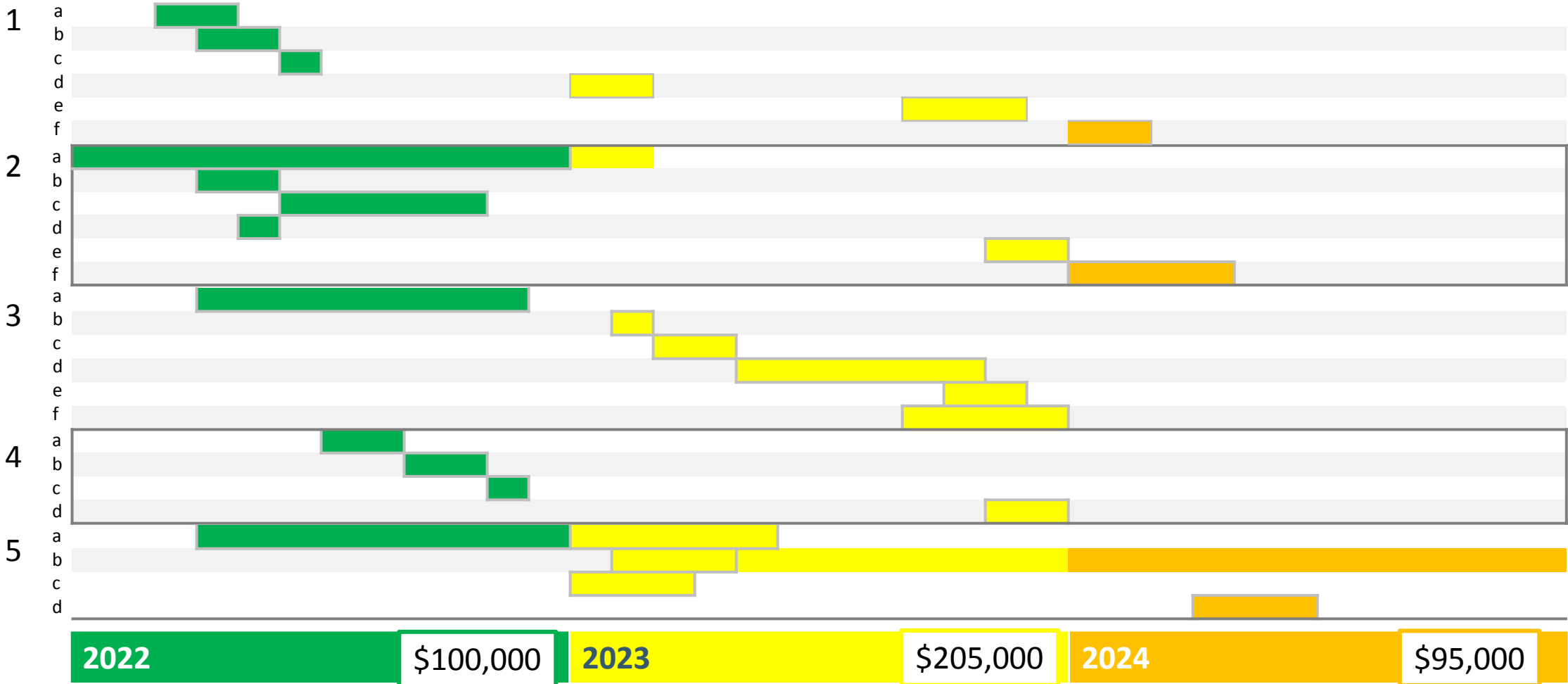
✓



Timeline

A conceptual image for a timeline. A person in a white shirt and dark pants stands on a dark staircase, reaching out with their right hand towards a glowing cityscape at night. The background is a deep blue with a network diagram overlay of white dots and lines. The word 'Timeline' is written in white on the left side.

Action Plan Timeline



Savings: Work Management Solution

- Biggest impact is on labour expenses. Typical municipalities have 80% reactive vs 20% planned maintenance. Moving this to 60/40 reactive vs. planned will drastically reduce overtime and extend equipment life.
- Implementing preventative maintenance (PM) on equipment leads to an average 20%* reduction in equipment downtime.
- ~18%* reduction in parts inventory expenses by tracking parts usage to work and eliminating money tied up in stale stock.
- ~28%* increase in labour productivity by digitizing the tracking and assignment of their work:
 - Reduced overtime (optimize resource assignment)
 - Reduced emergency maintenance (PM program)
 - Reduced paperwork (it's digital)
 - Reduced time on purchase orders (it's digital)
- Capturing work order costs (material, equipment usage, labour effort) optimizes the PM program and reduces overall work costs



* A.T. Kearny in Industry Week surveyed 558 companies to identify improvements

Savings: Capital Planning Solution

- Moving to a level-of-service evaluation of facility and infrastructure assets will enable you to target your capital projects to improve or maintain your assets. Remediations contribute improvements to your Tangible Capital Assets.
- An asset condition assessment sets a baseline from which to base improvements
- Once a PM program is in-place, and asset condition assessments are complete, the Town will have a firm basis to target their capital improvement program to meet a level of service. This may mean a short-term increase to capital spending to improve deficient assets, but PM + level of service will optimize the Town's capital program.
- Additional savings by deferring maintenance activities to major infrastructure based on condition assessments.



Savings: Digitizing Service Request Portal

- **50%** of PW Call Coordinator time is used in the following activities:
 - Entering problem reports into work management system
 - Capturing contract labour, material, and equipment costs and correlating these to individual work orders – all paper-based
 - Compiling reports to council for service requests
- Supervisors follow up with residents on most service requests:
 - ~800 service requests annually
 - ~15 minutes per follow-up call = 200 hours of supervisor time @ \$65/hour
 - \$13,000 annual savings
- Clarification of what is needed by PW for each problem type means that PW Call Coordinator can handle the follow-up information requests. This can be codified into a Wiki or other knowledgebase



Summary

There are five initiatives identified to implement and support the Solution Architecture that realize six outcomes related to digital transformation.

The roadmap allocates activities and identifies required resources over the 2022-2024 fiscal years to achieve the digital transformation outlined in the Solution Architecture.



People



Process



Technology