



Data Driven Approach to Modernize the Delivery of Transportation Services

ELIGIBLE ENTITY APPLYING TO RECEIVE FEDERAL FUNDING:

- ❖ Utah Department of Transportation jointly with the Hawaii Department of Transportation

TOTAL PROJECT COST

- ❖ Hawaii: \$7,740,000 Utah: \$4,110,000

Are matching funds restricted to a specific project component?

- ❖ No – However the funds only support one year of a multi-year effort

ATCMTD REQUEST

- ❖ Hawaii: \$1,290,000 Utah: \$685,000

State(s) in which the project is located:

- ❖ Hawaii
- ❖ Utah

Technologies proposed to be deployed:

- | | |
|--|--|
| <ul style="list-style-type: none"> ❖ Business Intelligence Platform and Data Analytics Services ❖ Performance Management | <ul style="list-style-type: none"> ❖ Asset Management ❖ Pavement Management ❖ Safety Management |
|--|--|

Is the project currently programmed in the:

- | | |
|--|--|
| <ul style="list-style-type: none"> a) Transportation Improvement Program (TIP): b) Statewide Transportation Improvement Program: c) MPO Long Range Transportation Plan: d) State Long Range Transportation Plan: | <ul style="list-style-type: none"> ❖ Components of this project are a part of each of these programs in both Hawaii and Utah. |
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PROJECT NARRATIVE

Introduction

The mission of the United States Department of Transportation is to “Serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future.”

State Departments of Transportation (DOTs) around the country have operated with this mission in mind while providing services to citizens within their respective states. Historically, these services have consisted primarily of building structures – roads, bridges, airports, railroads, etc. – and then maintaining them in good working condition over their usable life. While this is still true today, the rapid and ongoing integration of information technology into the nation’s transportation system as well as new and increased demands on State DOT’s from a citizen population that is both empowered with internet connected smart devices has required dramatic changes in the ways in which these services are delivered and how performance is transparently communicated. Examples of these changes include:

- Consumers are changing the way in which they engage with the transportation system. Smart cars, driverless and connected vehicles, smart roads and ride sharing services will impact all aspects of the transportation system – from how DOTs are funded, to how roads are constructed and maintained, to how consumer behaviors are tracked and managed. These systems also generate mountains of data that must be collected and managed by state agencies.
- In response to citizen demands, the Federal Highway Administration (FHWA) has increased reporting and transparency requirements for state agencies – including detailed analysis of how federal funds are managed and applied, as well as detailed reports on common goals such as safety, the condition of assets and the optimization of the transportation system.

While these changes could certainly be viewed solely as challenges, through a different lens they can also be viewed as opportunities. For example, new sensor technology, data capture methods, communication networks and analytical tools, has enabled a new generation of analytical solutions that - once integrated into the physical infrastructure – will lead to opportunities to make significant improvements in areas, including:

- Internal organizational efficiencies
- Improved management, operation and maintenance of assets
- Better safety and security for users of the transportation system
- Enhanced interaction with their customers
- Quality of life improvements

By taking advantage of these new technologies, agencies will increasingly be able to make more informed decisions quickly and measure and communicate the impacts of their decisions effectively. The resulting performance improvements can be tracked continually and a process of continuous improvement put in place that enables DOTs to benefit from these new approaches into the foreseeable future.

With this vision in mind, the Hawaii Department of Transportation (HDOT) and Utah Department of Transportation (UDOT) are making significant investments to take a data driven approach to the modernization of their transportation systems and are now poised to step up and deploy innovations that will result in significant benefits in efficiency, cost savings, customer service and improvements in

the performance and safety of their transportation assets.

In 2016, the Utah DOT began a program to implement a flexible, cloud based business intelligence and data analytics platform that embraces an open data philosophy, uses open standards and an agile deployment approach to drive these changes. This approach has helped keep costs down during implementation, enables repeatability across agencies and the agile approach has helped prioritize objectives and deliver incremental improvements quickly and continuously. Seeking to replicate UDOT's success, the Hawaii DOT is expanding upon a statewide data program and investing heavily its own program starting in the summer of 2017 that will take the same approach.

To support these programs, HDOT and UDOT are seeking a \$1.975M grant under the United States Department of Transportation (USDOT)'s Advanced Transportation Congestion Management Technologies Deployment (ATCMTD) initiative to build on the existing work in Utah and establish a similar program in Hawaii that will use data to modernize the services that they deliver to their constituents and will serve as a model public sector entities to follow.

This funding request is looking to not only broaden the areas of innovation, but also to enhance the overall solution design and deployment framework such that it would make it easier for other transportation agencies to deploy similar solutions quickly and cost-effectively. Given the relative difference in prior investment in information technology systems between UDOT and HDOT, the lessons learned by each agency during their deployment will ensure that a wide range of other agencies – including MPOs, City DOTs, rail road and port authorities and more -- will benefit from their experience and the federal DOTs investment.

Utah Department of Transportation Background

The Utah Department of Transportation is seen by its peers as highly progressive and has made significant investments in modernizing its transportation system over the past several years. Examples of these investments include:

- Deployment of sensors on state roads that collect information on traffic counts, speeds, and more.
- Investment in several new information technology systems, including systems to handle core functions such as asset management, pavement management, traffic management, maintenance and more.
- The development of centralized data warehouses that consolidate information from the organizations key transactional systems – including finance – into a central repository that can be utilized for further analysis.

In addition to these direct investments in transportation system technology, in May of 2016 UDOT initiated a data driven transportation modernization program focused on business intelligence that has allowed the organization to begin taking advantage of its data assets. Over the past year, the program has had several significant accomplishments as reflected in the table below:

Date	Accomplishment
June '16	▪ Prototype of the Regional Program Director Update (RPDU) using static data.
July '16	▪ Automated nightly updates to the RPDU
November '16	▪ Internal release of the Strategic Direction document including: <ul style="list-style-type: none">○ Establishment of performance metrics for each of the organization's key strategic

	<ul style="list-style-type: none"> objectives <ul style="list-style-type: none"> Automated updates and drill down capabilities for several key underlying data sets Implementation of capital budget and expenditure data within Socrata's financial modules.
January '17	<ul style="list-style-type: none"> Public release of 2017 Strategic Direction document in support of State Legislative session
February '17	<ul style="list-style-type: none"> In preparation for April quarterly meetings, released RPDU v2 with several major enhancements
March '17	<ul style="list-style-type: none"> Implementation of R server to support rapid automation of extract, transform and load (ETL) processes, complex calculations, and predictive / prescriptive analytics.
April '17	<ul style="list-style-type: none"> Enhancements to the strategic direction document including the public release of crash data sets

UDOT's business intelligence program leverages investments in several different commercial and open source technologies, including Oracle data warehouses and data integration tools, the Socrata Transportation Data platform, the R analytics programming language, python, SQL and more. These investments are funded via a 5-year recurring contract with Grant Thornton, with an annual value of \$685,000.

UDOT is seeking \$685,000 in federal funds to expand upon this program over the next calendar year – adding more datasets to the system, expanding its efforts beyond descriptive analytics to perform diagnostic and predictive analysis and to leverage optimization processes where possible.

Hawaii Department of Transportation Background

In contrast to Utah, the Hawaii DOT has not invested heavily in the modernization of the technology supporting its transportation system. Thus, it has become increasingly difficult for the organization to meet the demands of its constituents, provide transparent reporting to the public and to the Federal Highway Administration, and fulfill its mission.

To address these challenges, the State of Hawaii has allocated \$1,000,000 per year for the next five years to the Department of Transportation to:

- Initiate a business intelligence program that will support its short- and long-term data management and reporting needs; and
- Develop an information technology roadmap that will guide future investments as it modernizes the technology supporting its transportation infrastructure.
- Execute on the prioritization of mission critical systems improvements to support an even more aggressive data driven performance improvement effort

These funds are in addition to the \$290,000 the State has been spending annually over the past several years to fund an open data reporting environment supporting its DOT and other state agencies.

Just like the State of Utah, Hawaii plans to leverage the Socrata Data Platform and the services of Grant Thornton to complete this project and is requesting \$1,290,000 in matching federal funds to support the initiative over the next calendar year. If granted, Hawaii will be able to greatly accelerate the pace at which it is deploying its business intelligence system and modernizing the rest of its information technology environment.

Why Together?

While starting from different baselines within their own transportation programs, UDOT and HDOT have decided to jointly apply for federal funds because they believe strong synergies exist between their initiatives, and they understand that by working together they will be able to achieve more. For example:

- HDOT will be able to take advantage of UDOT's experience and lessons worked working with both the Socrata Data Platform and Grant Thornton to speed the implementation of their solution.
- UDOT will be able to leverage investments that HDOT is planning to make in areas that UDOT has not yet explored within the business intelligence tool – such as tracking of maintenance tickets, and the automation of MAP-21 reporting.
- The organizations will be able to share with each other insights gained from the analysis of their respective data sets that could allow for mutual improvements in the operation of their respective transportation systems.

In addition, because each organization is starting from a different place and has made very different levels of investment in technology over the past several years – HDOT and UDOT believe that their experiences will provide a wide range of lessons learned that can be leveraged by other DOTs that are pursuing similar projects, no matter where their starting or ending points are.

Expected Benefits

Overall, this project is expected to generate significant benefits to each agency, including:

1. **Support for better decision making.** The business intelligence system will take existing organizational and transform it in ways that will be used by both agencies to support better decision making. By leveraging these data assets, both organizations will be able to measure organizational performance against their stated goals as well as diagnose the drivers of organizational performance. This will result in data driven policy making that has historically resulted in between 20 – 30% increases efficiency as well as improved program delivery, cost savings and more.
2. **Increased efficiency.** By using this business intelligence system, both agencies will see efficiency gains organization wide. During the first year of the project, in addition to streamlining many reporting and management activities, UDOT automated the production of its annual “Strategic Direction” report, transforming it from an eight-month yearly project into a nightly process that refreshes every day with current information. It is expected that both agencies will see similar gains as they apply the business intelligence capability to other areas of the organization.
3. **Cost savings.** HDOT is expected to see significant costs savings from the implementation of the business intelligence tool. Without the business intelligence tool, in order to satisfy federal reporting requirements, HDOT would need to make costly investments in several core transportation technology systems such as asset management, pavement management, traffic management and more. With the tool, many legacy systems will be able to forgo full replacement saving the agency millions of dollars of spend on new software and applications.
4. **Improvements to program delivery.** By analyzing its organizational data, it is expected that both agencies will make big improvements in terms of program delivery. This means more efficient project implementation, cheaper maintenance and less crashes, injuries and fatalities.

For example, by analyzing its crash data to determine the statistically most likely causes of accidents and fatalities, both agencies will be able to direct funding to the programs that will have the biggest impact on saving motorist lives – even if those identified are not immediately obvious.

5. **Transparent reporting to internal and external constituents.** Using the business intelligence solution, both agencies will be able to transparently report on organizational performance to their constituents. Whether it's a concerned citizen trying to understand how the State's transportation dollars are being spent or a state legislator looking to understand improvements in his district, nearly every key stakeholder will be served by the new solution.,
6. **Knowledge to support other states and other state agencies with similar projects.** In addition, by taking on this project both HDOT and UDOT will gain significant knowledge and skills that can be used to help other state agencies and other DOTs around the country. Whether its sharing the results of an analytic study or simply sharing lessons learned, both agencies are committed to supporting their peers. As an example, UDOT will be leading a knowledge sharing workshop this summer sponsored jointly by the American Association of State Highway and Transportation Officials (AASHTO) and the Transportation Research Board (TRB). Meanwhile, HDOT has plans to leverage its investment to provide guidance to the Harbors and Airports divisions of its agency as well as other public sector entities within the state including the City and County of Honolulu and their road and rail divisions.
7. **Enhance the value of existing investments in information technology.** By nature, the business intelligence solution will help both agencies to increase the value of investments that they have already made in transportation technology. By taking data already being generated by their source systems (or manually collected and recorded in Excel or Access databases) and importing it into the business intelligence platform, both agencies will create additional knowledge and value.

Overall, the new system will help us to quantify and articulate manpower, equipment and material resources and needs much more efficiently and effectively. This tool will allow management to allocate resources in the most cost effective manner and provide a direct connection between services delivered to the traveling public and financial resources provided to the Highways Division. Thus, the public will directly benefit as our roadway assets are managed with better efficiency.

While both states are fully committed to completing the business intelligence project, even in the absence of federal funding support - there are several direct benefits to the program that federal funds will provide:

1. **Ability to move faster.** By leveraging federal funds, both states will be able to make progress much faster than they would be able to by funding the projects on their own. This means that more data will be added to the system at a faster rate and more of the benefits outlined above will be achieved in the next calendar year.
2. **More analytics and greater impact.** In addition to moving faster, federal funds will provide the agencies with the ability to leverage consulting resources supporting the project to conduct additional analytic analysis. Specific areas expected to be addressed with federal funds include the causes of crashes and fatalities, predictions of project cash flows, analysis of historical and real time sensor data, optimization of pavement application schedules and more.
3. **Greater Collaboration.** By jointly receiving federal funds under the DOTs ATCMTD program,

there will be more collaboration between UDOT and HDOT during the deployment of data driven modernization efforts.

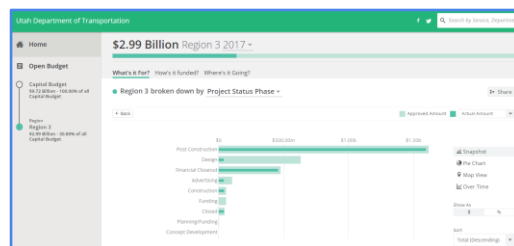
Project Approach

While the specific activities expected to take place over the next year in Utah and Hawaii will be different given their respective starting points, below we have outlined a general approach to their respective programs that describe some of the expected outcomes for each functional area within the agency:

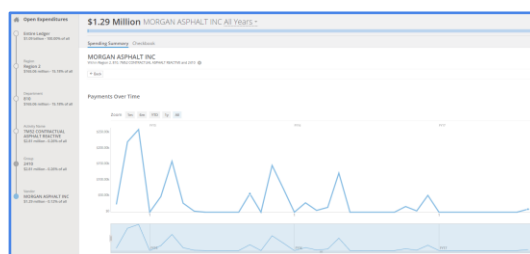
Finance and Accounting

Using data from several existing source systems, including FAMIS and the AS400 in HDOT and FFMIS and the financial data warehouses in Utah, both UDOT and HDOT will be able to create financial reports on budgets and expenditures with drill-down capabilities based on categories such as region, department, project, project phase, fund source, vendor, expense category and more. These reports will simplify the annual process that the agencies use to report required financial information to the FHWA as well as provide line managers with the information they need to efficiently manage organization financial resources.

This functionality will be enabled using Socrata's budget and expenditures modules – screenshots can be found below:



UDOT displays its Capital Budget for Region 3 in an easy-to-explore interface that shows total budgeted dollars and their YTD utilization.



UDOT is able to quickly see expenditures over time as in the above screenshot of all historical payments to MORGAN ASPHALT INC, in real time

Capital Project and Program Management

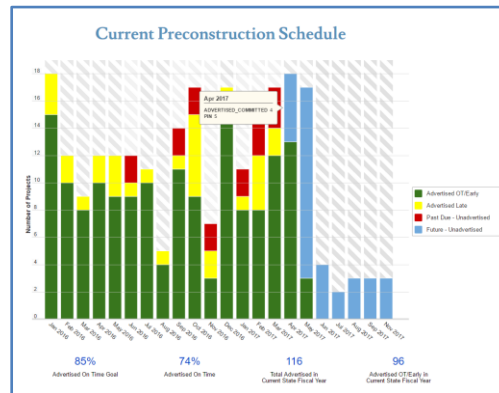
Several enhancements will be made to the way in which both organizations manage their capital projects and programs, including:

- The Microsoft Excel and Access based management tools used by HDOT today will be replaced by reports built within the Socrata modules that will not only provide summary level information that can be used to manage the business, but will also allow employees to drill down into the data asking questions that will support better decision making, problem identification, and more

efficient allocation of resources.

- UDOT will continue to make enhancements to the program delivery report developed last year to support changes requested by users within the regions.

While the exact format for these reports will not be determined until the project is underway, screenshots from the report developed by UDOT last year are shown below:



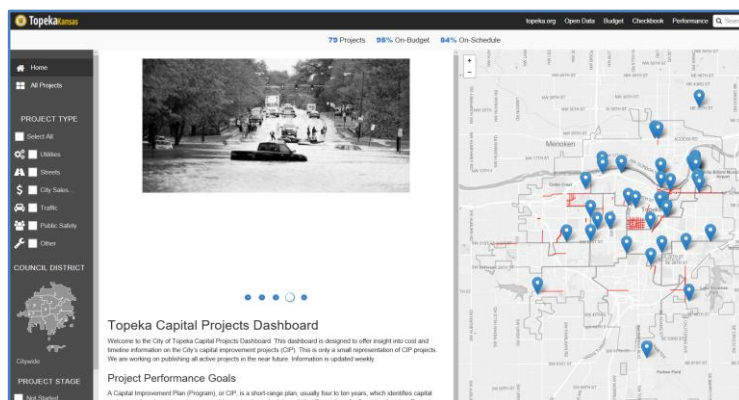
UDOT's Pre Construction Schedule is updated in real time and displayed as a visualization on standard and custom reports as needed.



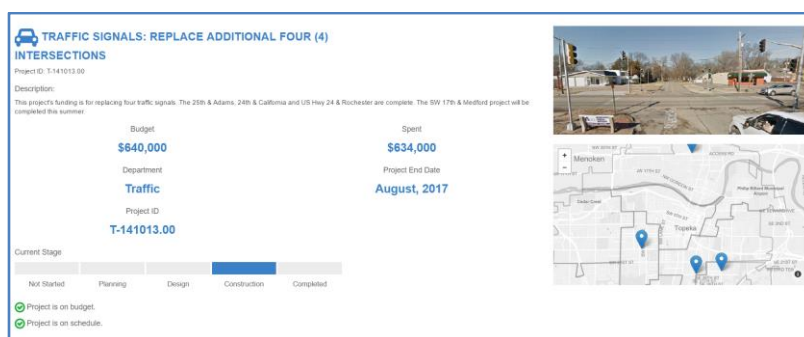
UDOT uses reports that lets a user of any sophistication explore their data by clicking on a bar graph (yellow is selected) and having the remaining graphs/charts/maps filter based on that selection.

In addition, if federal funds are received both UDOT and HDOT will be able to leverage Socrata's Capital Projects module to provide transparency to the public and actionable data driven insights about the capital projects currently underway including their location, status, budget, completion date and expected benefits.

Example screenshots can be found below:



Topeka's Capital Project's Dashboard displays a map based contextual interface for anyone curious about the status of individual projects around them.



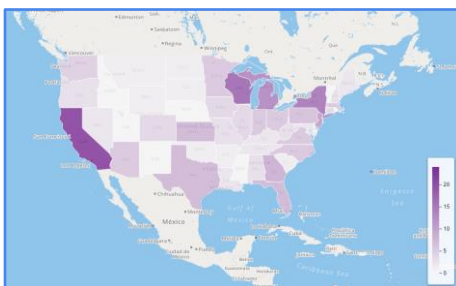
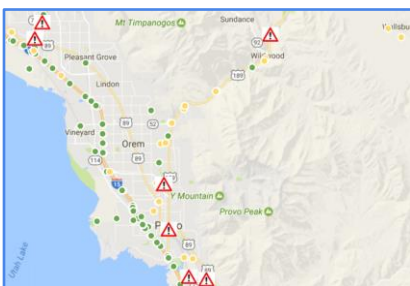
Drill down into any capital project to see images, stage status and budget information.

Asset Management / GIS

Viewed as an asset management tool alone, the analytics platform will have several specific benefits for HDOT. Data from each of the disjointed asset management work order processes and systems that exist within each District will be centralized onto a common business platform. This will enable more consistent management and the use of a built-in Geographic Information System (GIS) to provide a more holistic view of assets of all types, including Roadway surfaces, signs, guardrails, guardrail end treatments, lighting, striping, bridges, etc. By centralizing asset management, HDOT will be able to meet Federal Highways Administration MAP 21 compliance timelines.

UDOT will leverage the business intelligence system to enhance its existing asset management system – providing reports on other organizational data sets tied to geo-coded information.

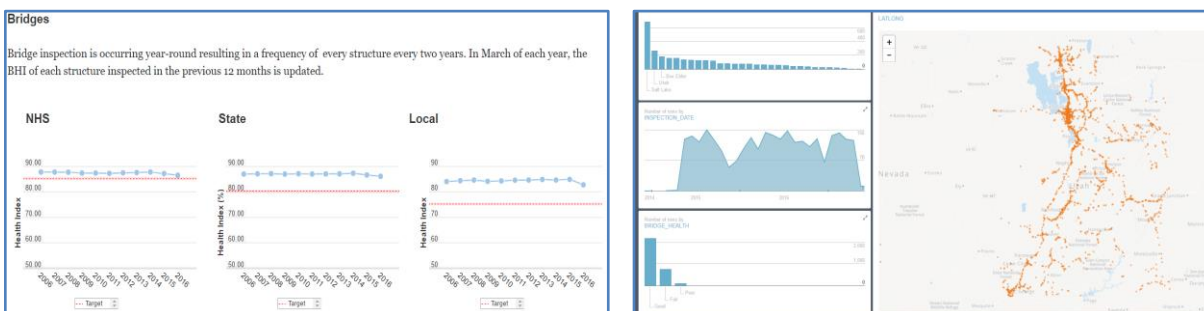
This functionality will be enabled with existing integrated Socrata modules.



Bridges and Structures

Today, the condition of bridges and other structures managed by HDOT is recorded in various spreadsheets and in locally accessible applications installed within each region. This data will be consolidated using the analytics and management platform and reports will be generated in a manner consistent with what UDOT accomplished during the first year of its project.

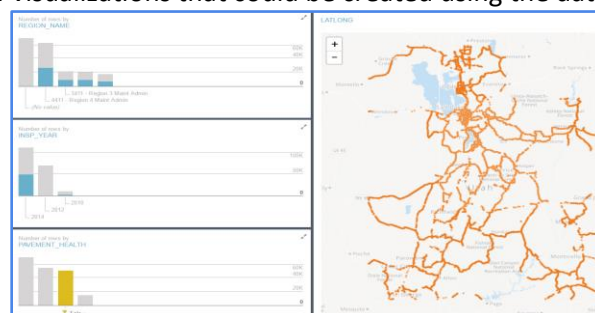
See the screenshot below for an example of the bridge / structure condition reports generated by UDOT:



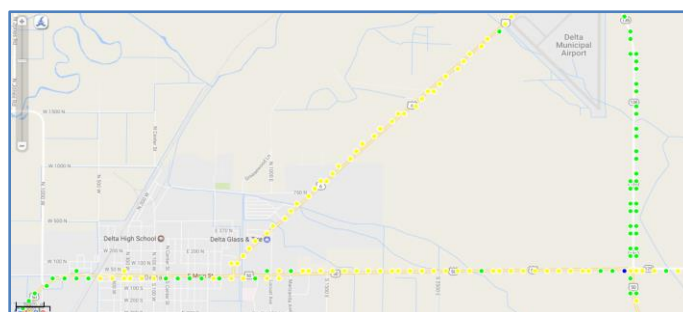
Pavement Management

Hawaii currently stores data on pavement condition in an application called MicroPaver. As a part of this project, this data will be loaded into the Transportation Modernization Platform for further analysis, including drill-down capabilities. This functionality will be enabled with existing Socrata modules. Using the data analytics tool in this manner will simplify the reporting required to meet the FHWA's MAP-21 compliance requirements. As with the bridges and structures category, HDOT will be able to leverage the work that was done by UDOT last year to help guide them through the process.

An example of the types of visualizations that could be created using the data are shown below:



Users are able to easily explore Pavement Health data by clicking on the health criteria (yellow) and seeing the resulting pavement that matches the criteria.



Configurable iconography within the reports makes it easy for any user to see the status of work orders and pavement health.

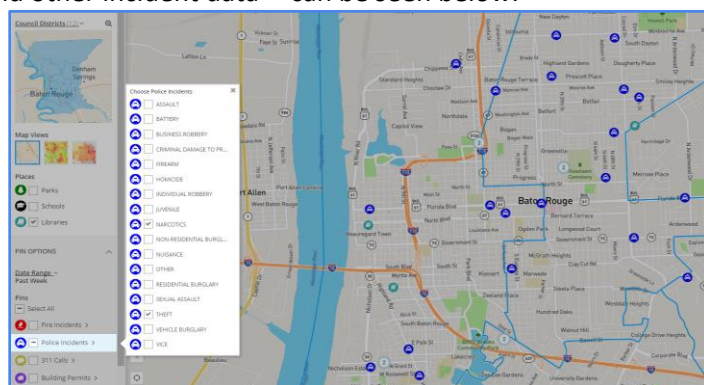
Maintenance

One of HDOT's priorities for the project is to make improvements to its maintenance system. Currently, maintenance ticket data is stored within its AS400 and the 4Winds systems. This data will be brought into the business intelligence tool and drillable reports will be generated that will allow the organization to better manage its limited resources.

In addition, using the Socrata Citizens Connect module, maintenance ticket requests will be displayed transparently to the public using an interactive presentation that allows for sorting and filtering based on the type of ticket, the region, and more, over a selected date range.

While UDOT has not yet explored using its business intelligence platform to manage maintenance requests, it plans to do so in the upcoming year and with federal funds will be able to take advantage of lessons learned from Hawaii as well as to deploy Citizens Connect, a module currently not available to the organization.

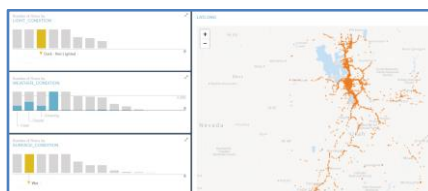
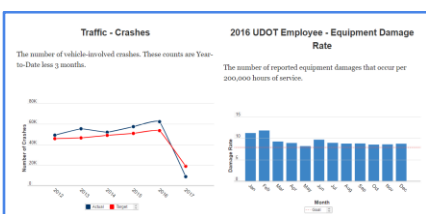
A screenshot from the City of Baton Rouge, LA's deployment of Citizens Connect – which is used to manage police, fire, and other incident data -- can be seen below:



Traffic and Safety

At HDOT today, traffic and safety data is recorded using a paper-based system. As a part of this project, the Socrata / Grant Thornton team will help HDOT to manually transform this information into an electronic format that can be used within the analytics and management platform. Reporting on the number of fatalities, injuries and crashes is a key component of the FHWA's MAP-21 compliance program that will be greatly simplified using this tool. Similar to the approach in several other areas, HDOT will be able to speed the deployment of this component of the solution by leveraging the experience UDOT gained last year automating the reporting of traffic and safety statistics.

Example graphics are shown below, produced using existing modules which are used to report on and visually explore data.



Executive Management and Transparency

Using the full suite of tools and datasets mentioned in each of the previous sections, HDOT will be able to produce and publish to the web an annual strategic direction report, which will outline its goals and objectives for the year, the programs it has established to achieve those goals and performance statistics – something it does not produce today. In other states, producing this annual report can take upwards of eight months out of the year. Using the data analytics and business intelligence tool, once built, this report will update on a nightly basis with the most up-to-date information from the source systems that feed it. HDOT will be able to leverage UDOT's experience creating a similar report last year to ensure that this process will be a success.

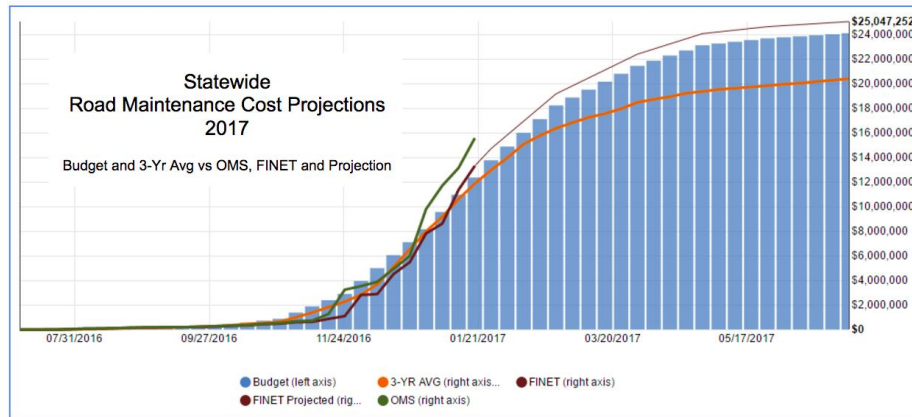
Screenshots of UDOT's strategic direction report are presented below:



Diagnostic and Predictive Analytics:

In Hawaii, while much of the work during the first year will be focused on bringing data from existing systems and unstructured data sources into the tool – in Utah a significant enhancement to the program that will be enabled using federal funds will be the addition of diagnostic and predictive analytics to its existing deployment of Socrata. While the organization completed some work in this area (see snow and ice budget example below) during the previous year, it hopes to do significantly more throughout fiscal year 2017. For example:

- Analyze crash data statistics to determine causes of traffic accidents and fatalities. These results will then be used to drive funding and program dollars to address areas that will have the greatest impact on safety.
- Predict cash flows for construction projects based on project type, vendor, season and other categorical variables.
- Correlate data from various functional areas to see if there are impacts that will improve key performance indicators. For example, does the type of pavement applied to a road or the pavement condition have an impact on the number of crashes?
- Trend analysis of traffic statistics to predict areas of future economic development within the state.



In the dynamic visualization shown above, the orange line demonstrates UDOT's old prediction model that predicts a budget surplus of nearly \$3M. The dark red line is the updated, arima+Socrata Data Platform model forecast, which demonstrates a need for nearly \$5M more in funding for road maintenance costs, over the current predictive model. This means instead of anticipating a surplus and spending funds on alternative initiatives, UDOT is armed with much more accurate data, allowing them to proactively prepare for a small budget deficit (the anticipated deficit is represented the difference between the dark red predicted-spend-line and the blue bars which represent the department's total seasonal budget).

Governance and Project Management

[REDACTED]

[REDACTED]

[REDACTED]

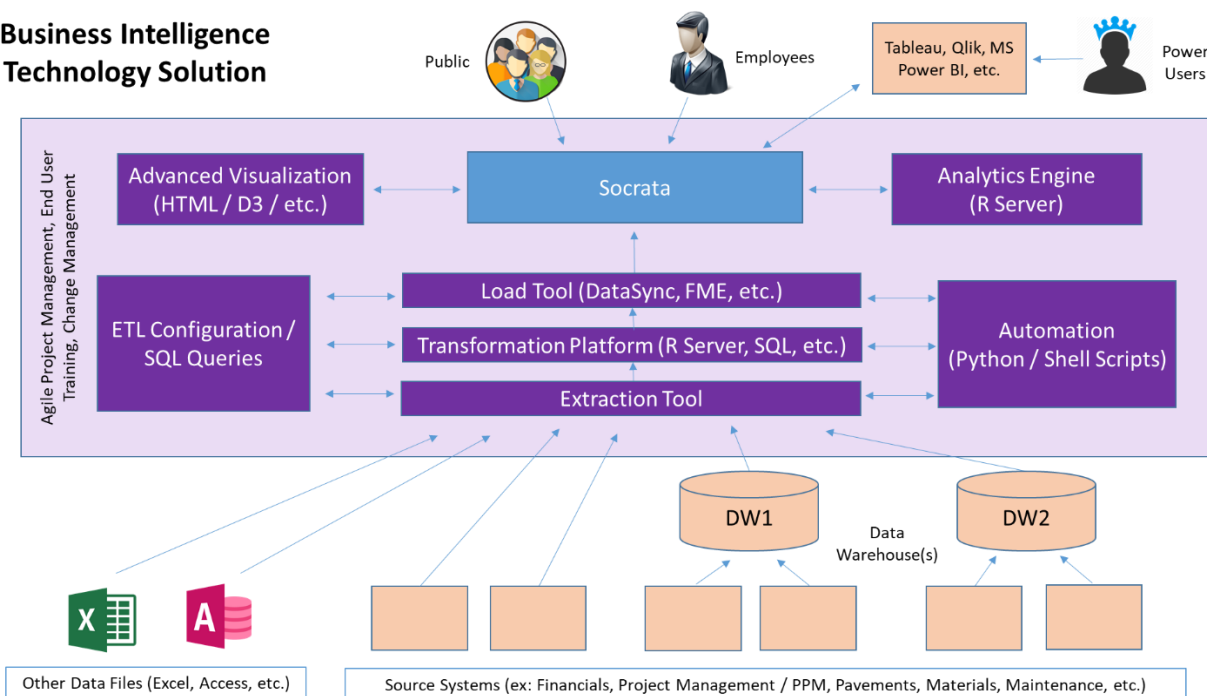
Potential Challenges

There are no regulatory, legislative or institutional challenges that would prevent the transportation modernization platform from moving forward in either Utah or Hawaii.

Technology Partners and Alternatives Considered

HDOT and UDOT will be partnering with private sector technology and service providers in support of this initiative. The business intelligence system will be built using software primarily from Socrata but will also be by software from several other companies including Oracle, Safe Software, Microsoft and Amazon, as well as the open source platforms R and Python. Consulting services will be provided to both HDOT and UDOT by Grant Thornton, LLP. An overview of the technology solution can be found below:

Business Intelligence Technology Solution



Information on each partner and the role they will play can be found below:

Key Partners:

- **Socrata, Inc.** is the global leader in providing open data solutions to public sector organizations at the federal, state and local level. They have unparalleled capabilities in making data easier to find, access, use, and understand. Founded in 2007, they have over 10 years of experience building and maintaining data-based performance management platforms for public sector organizations all over the world – including existing relationships with both the State of Hawaii and the State of Utah. Further, they have significant experience working with transportation based clients – a valuable differentiator on this engagement.

Socrata's cloud software platform will be at the heart of the business intelligence system acting as a storage point for data and hub through which users can interact, explore, and share data with internal and external constituents. Socrata's purpose-built modules for the exploration of project data (Projects Explorer), financial data (Open Financials) and time-based data (Citizens Connect) will provide additional value to both UDOT and HDOT.

- **Grant Thornton LLP**, formed in 1924, is the United States member firm of Grant Thornton International, the fifth largest business advisory and global accounting organization in the world. Grant Thornton's Public Sector practice is a global management consulting practice comprising over 900 employees. These team members have been serving the local, state, and federal

governments for more than 25 years, providing advisory and audit services in systems implementation oversight, IV&V, IT PMO services, IT strategy and governance, decision analytics, business process modernization, organizational change management, financial statement and internal controls audits, performance auditing, financial analysis and reporting, and contracts compliance oversight. The firm has specific expertise in the public-sector transportation industry providing technology oversight, system integration, analytics and financial management services to clients across the country including the Departments of Transportation in New York, Texas, Arizona, Utah, Virginia, Massachusetts and more.

Grant Thornton's role will be to provide project management and system integration services to both UDOT and HDOT as well as to provide analytic and transportation industry expertise. Grant Thornton will also be responsible for building an information technology roadmap for the State of Hawaii.

Other Supporting Technologies:

- In Utah, **Oracle** Data Integrator (ODI) will be used to support extract, transform and load (ETL) processes that will take data from source systems into the business intelligence platform.
- In Hawaii, **Safe Software's** FME will be used to support ETL processes that will take data from source systems into the business intelligence platform.
- Supporting the core technology environment will be a **Microsoft** Windows based system integration server that will support ETL and analytic processes.
- In Hawaii, the system integration server will be deployed using **Amazon's** Web Services.
- The programming language **Python** will be used to write scripts that will automate ETL, analytic and other processes supporting the business intelligence solution overall.
- Advanced diagnostic and predictive analytic capabilities will be delivered using the open-source technology platform R and its development engine, R Studio. This tool will also be used to support ETL processes.

After reviewing numerous alternatives, both HDOT and UDOT believe that this combination of technologies and service providers is the best fit for this engagement for several reasons, including:

- Combination of industry leading software solution and an experienced system integrator. Many software companies provide their own services. Socrata however, intentionally goes to market with Grant Thornton for DOT initiatives like this one, bringing together the best of both organizations. Together they provide HDOT with a comprehensive solution delivered expertly from implementation through to system management. Backed by extensive transportation experience, the Grant Thornton DOT practice, in concert with Socrata, will ensure that both HDOT and UDOT maximizes its investment.
- Socrata is already successfully used by both the State of Hawaii and the State of Utah. For the past several years, both the State of Hawaii and the State of Utah have been using the Socrata Open Data platform to provide transparent access to datasets from several state agencies to the public. Further, for the past year UDOT has been engaged with Socrata and Grant Thornton

developing its business intelligence platform.

- *Socrata's ease of use and publishing capabilities.* When compared with other software providers, Socrata's ease of use and ability to publish information, both using its purpose-built modules and in a story format increases user adoption across the enterprise, empowers the knowledge worker, and does so very cost effectively.
- *Grant Thornton's experience working with other State DOTs.* To maximize its investment in a Transportation Modernization solution, it is important for both UDOT and HDOT to benefit from industry best practices. By selecting a firm like Grant Thornton to provide services – one that has specific experience providing system integration and analytics services to other State DOTs including New York, Texas, Utah, Arizona and more – both organizations will benefit from being on the leading edge without being the bleeding edge of innovation.

Project Schedule

The business intelligence programs at HDOT and UDOT are multi-year efforts that will span beyond the timeframe for the requested federal funding. The timeline below highlights key activities that would be completed during the first year of the project following the receipt of federal funds. These activities are organized into several work streams:

	Project Month											
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
HDOT: Business Intelligence System Implementation												
Preparation and Planning												
Implement: Core Platform, Fontana and Perspectives												
Implement: Open Budget / Open Finance												
Implement: Projects Explorer												
Implement: Citizens Connect												
HDOT: Transportation Information Technology Consulting												
Information Technology Assessment												
Reporting and Recommendations												
UDOT and HDOT: Analytics Consulting and Support												
Define Quarterly Goals and Objectives												
Agile Development Cycle												
Project Oversight and Governance												

Work Stream #1: Business Intelligence System Implementation

This work stream is focused on the implementation of the Socrata Data platform at the Hawaii Department of transportation. The effort will start out with a preparation and planning exercise, during which Grant Thornton will assess the quality of data within the existing technology systems supporting each of HDOT's key business functions. This assessment will determine the level of effort required to transform data prior to it being loaded into the business intelligence tool and to determine a prioritized approach for the tool's deployment that will focus on bringing immediate value to HDOT.

Leveraging this plan, Grant Thornton will take a phased approach to the implementation of Socrata, adding new modules over the next several months, including the core platform, the web publishing engine and several purpose-built components as described earlier in this proposal.

Data from key business functions will be integrated into the system during this time with priority given to activities that will allow ty to manage and report on roads, bridges and other assets as well as safety and asset management statistics in accordance with FHWA requirements prior to compliance deadlines in the fall of 2017.

Work Stream #2: Transportation Information Technology Consulting

In parallel with the deployment of the Transportation Modernization Platform, Grant Thornton will also perform an assessment of the information technology environment at HDOT. It is expected that the initial assessment will take approximately four months, while the development of our final report and recommendations will take approximately two months. Once complete, Grant Thornton will then spend time supporting HDOT as it looks to procure new technology solutions to support its key business functions and will assist with the integration of data generated by these systems into the newly deployed business intelligence tool.

Work Stream #3: Analytics Consulting and Support

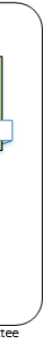
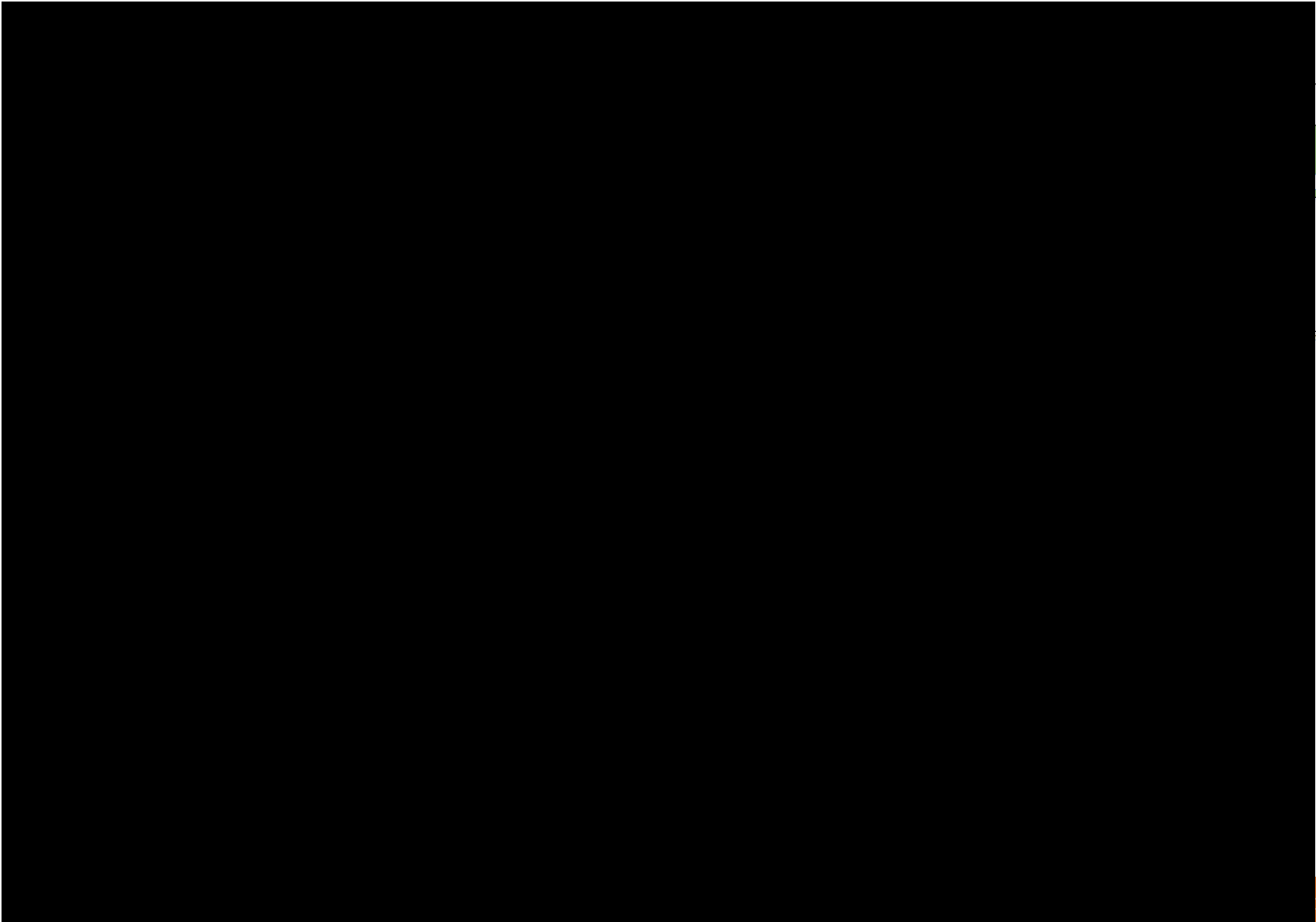
Throughout the entire first year of the project, Grant Thornton will work with both HDOT and UDOT to provide analytics consulting and support to the business intelligence programs. Each quarter, specific goals and objectives will be set by organizational leadership for each state's program. An agile project management methodology will be utilized to ensure delivery of these goals and objectives, with new functionality being delivered incrementally at the end of each two-week sprint cycle. Governance and oversight will occur continuously with reports being provided to all levels of management on the progress of the project. In addition, as part of this work stream information on progress will be delivered to the Federal Department of Transportation, including:

- **Monthly Progress Reports** that outline activities performed, anticipated activities and any changes to schedule or anticipated issues
- An **Annual Report** to the Secretary describing the deployment and operational costs compared to the benefits and savings and how the project has met the original expectations projected in the deployment plan.

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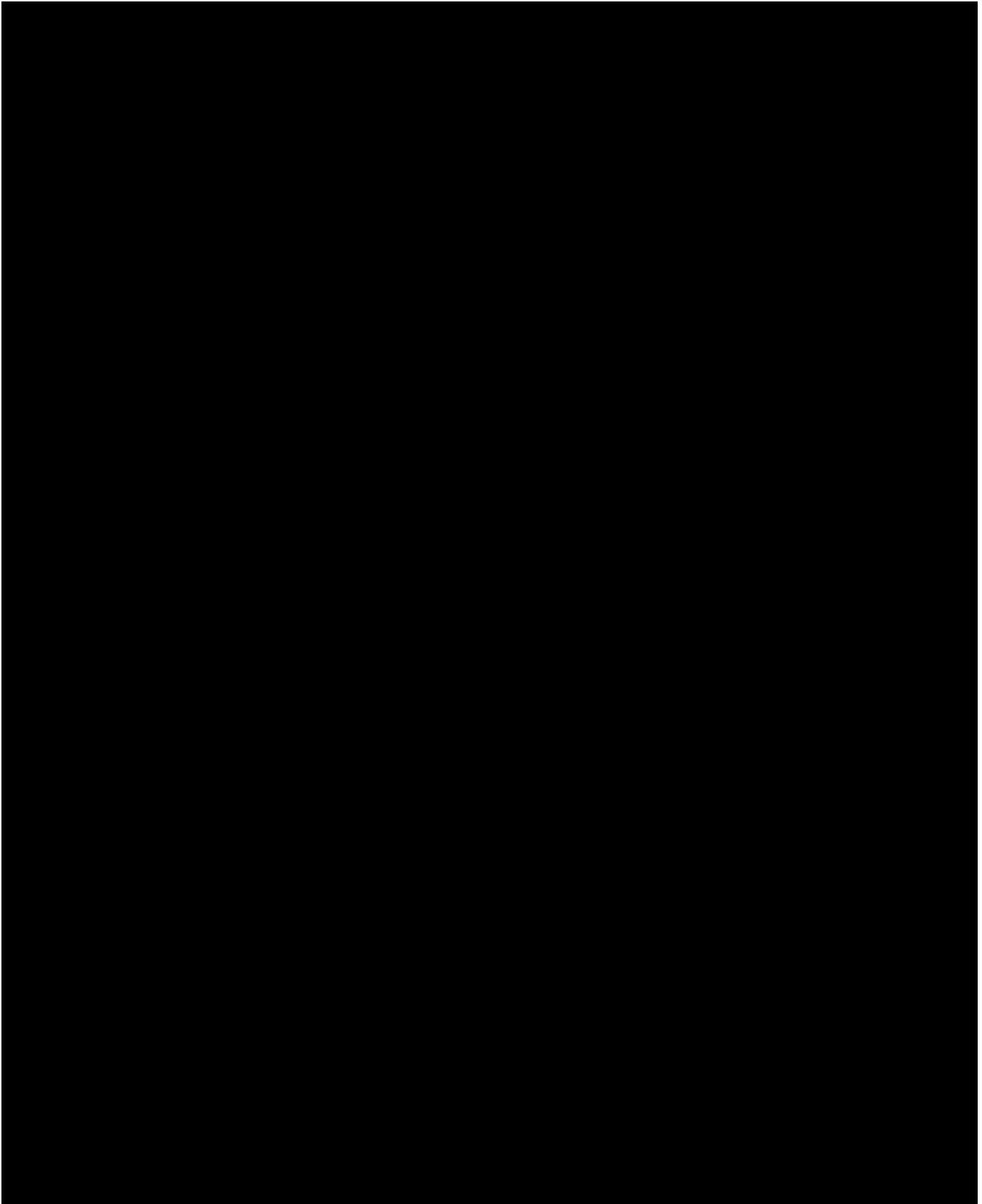
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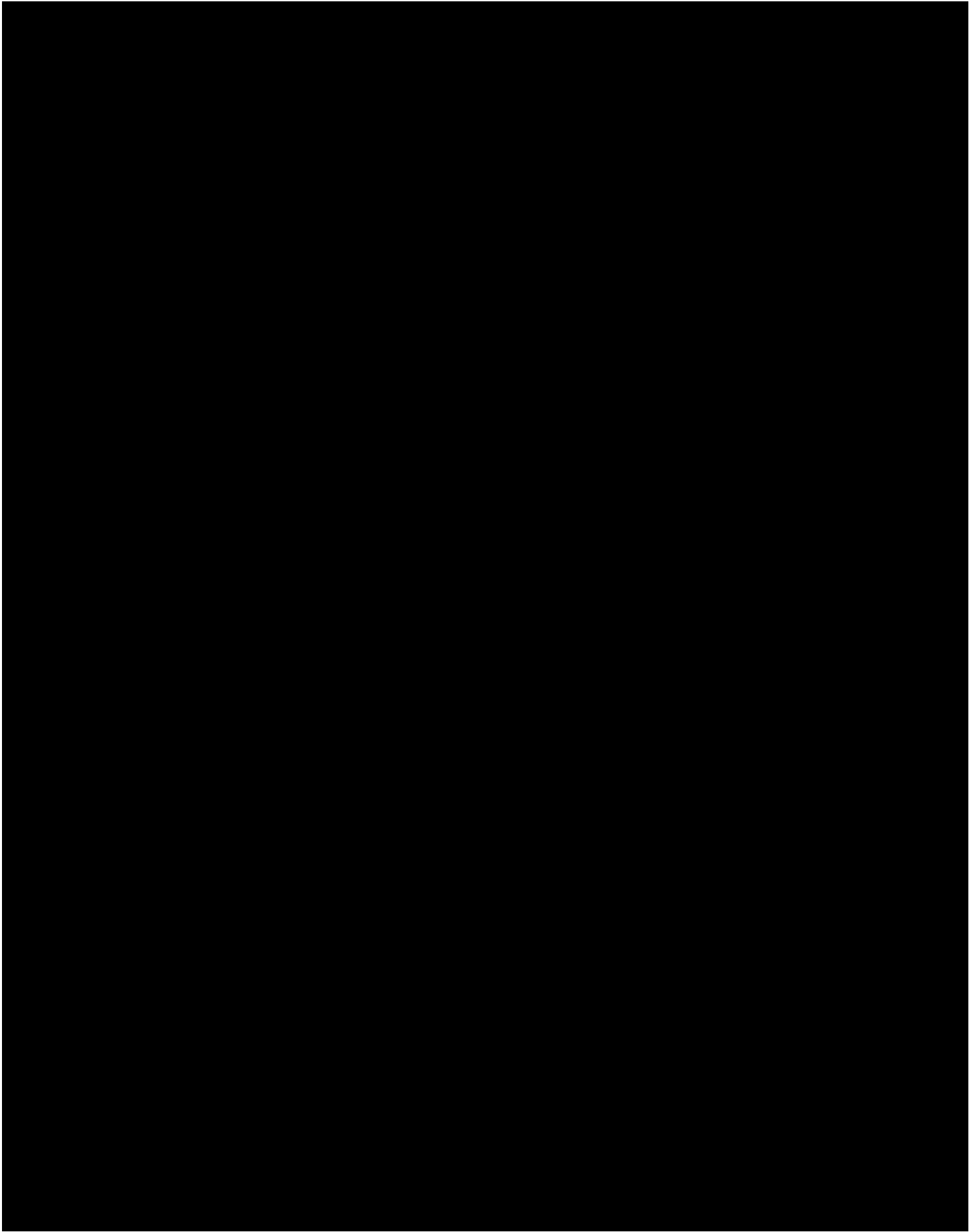
Biographies and role descriptions for key personnel are listed below:¹

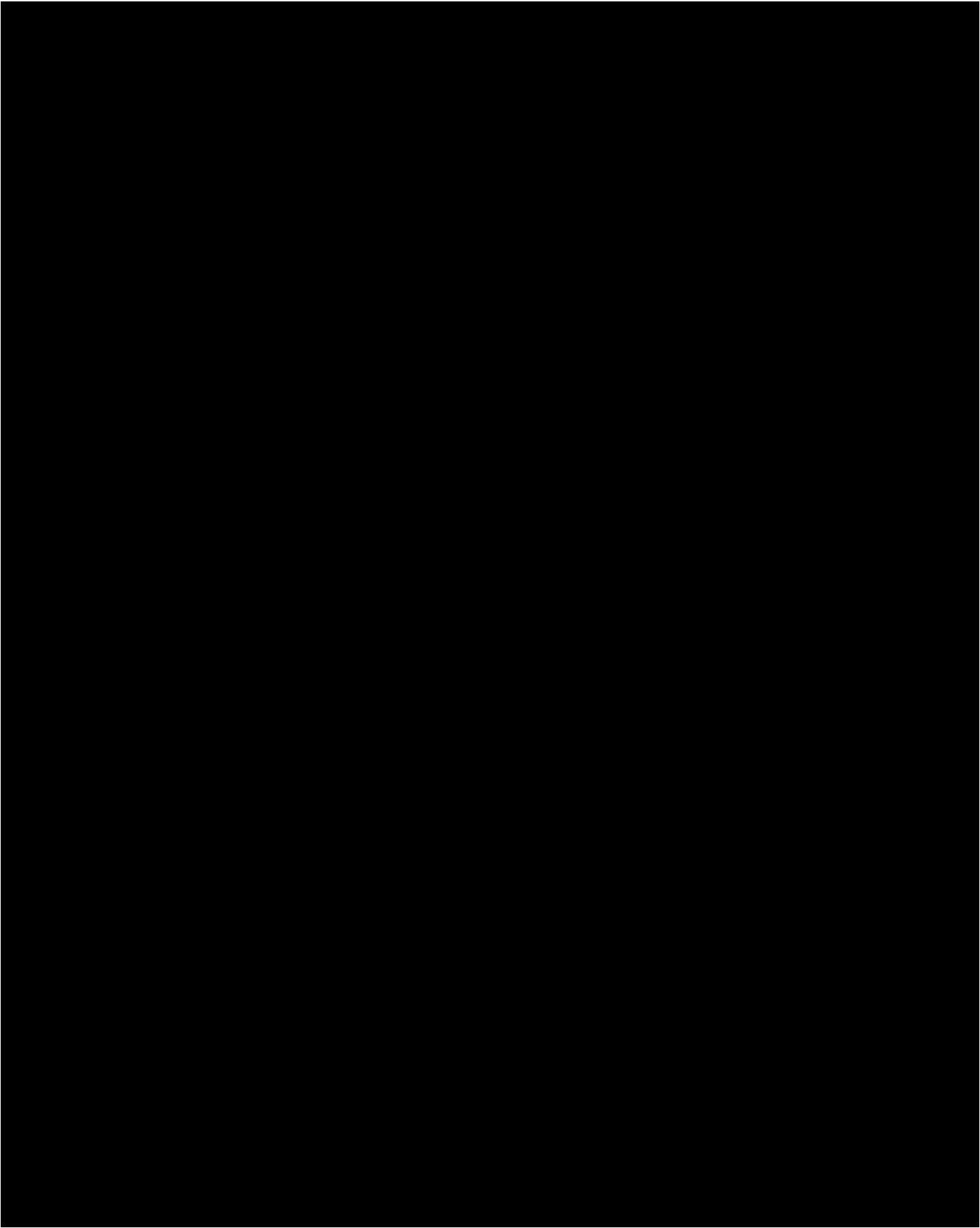
Utah Leadership Team

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¹ Note: Where indicated, positions are representative.









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