Discuss and consider approving a contract with Deloitte Consulting LLP for continued development of the data platform and associated transaction reporting to support toll transaction management

Strategic Plan Relevance:	Explore and Invest in Transformative Technology and Adopt Industry Best Practices; Deliver Multi-faceted Mobility Solutions; Invest in Effort that Extends Beyond Roadways
Department:	Operations
Contact:	Greg Mack, Assistance Director of IT & Toll Systems
Associated Costs:	$796,782 *(includes 6% project contingency)*
Funding Source:	183A Phase III Project funds
Action Requested:	Consider and act on draft resolution

Project Description/Background: Toll transaction management is a critical business process area within a tolling agency. The process begins when a vehicle travelling on a toll agency maintained and operated toll road passes through a toll gantry. Equipment at the toll gantry captures a suite of data that uniquely identifies the toll transaction. This data includes an image of the license plate used to extract the license plate number and state, vehicle axles, or class, date/time, location, and transponder device information. The resulting data set serves as inputs necessary to determine the toll amount, the individual responsible for paying the toll, and the payment path used to submit a request for payment. Additionally, toll transaction data is used for traffic and customer pattern analysis, monitoring and validation of toll system performance and accuracy, revenue and financial analysis, and other data points for the toll agency to make informed business decisions.

The Mobility Authority currently uses an outsourced solution developed by Kapsch TrafficCom to handle the end-to-end toll transaction management processes and workflow. To provide more flexibility in the future, in March 2021, the Mobility Authority awarded a contract to Deloitte Consulting LLP to begin development of the data platform to move to a stratagem wherein all toll transaction processing and data management capabilities after the point of transaction creation is advanced to a Mobility Authority-managed solution. A third-party vendor would continue to collect and create the toll transaction data set at the roadside, then pass the toll transaction data to the data platform within the Mobility Authority's network. The new approach gives the Mobility Authority more control of the data which will lead to better informed decision-making.

The Data Platform Project Explained
The objective of the data platform project is to transition all toll transaction data processing and data management capabilities after the point of transaction creation to a Mobility Authority-managed solution. A third-party vendor will continue to collect and create the toll transaction at the roadside, then pass the fully formed toll transaction to the data platform. Business logic and rules will then consume the transaction and route the payment request to either the Central United States Interoperability (CUSIOP) Hub or the Pay by Mail (PBM) vendor.

The Mobility Authority-managed data platform will also support additional business capabilities such as external reporting and internal data analytics. A connection to the Texas Department of Motor Vehicles' datasets will enable the Mobility Authority to better understand its customer base and their travel habits. Future development could include adding promotions and discount program logic.

The Solution Approach
To achieve the new transaction processing arrangement, the Mobility Authority defined a multi-faceted strategic plan to implement an end-to-end scalable tolling transaction system to meet current and future business capabilities. This architecture design provides solutions for:
- centralized, secure, and redundant data hosting for all data entities owned by the Mobility Authority and necessary for toll transaction processing;
- external data exchange points that provide flexible structured transaction data transmissions to and from third parties such as service providers, universities, or research institutions;

- multi-step modular pricing and discounting business logic;
- auditable data governance and security;
- user driven self-service data updates and business process administration; and
- public, external, and internal reporting.

The Mobility Authority has chosen a modular approach to complete the Data Platform Project. Release 1 established the platform. Release 2 created the routing and exchange processes. Release 3 focused on the development of pricing and billing modules, defined how data governance is handled in the new processing schema, and identified the suite of reports necessary to account for the agency's revenue and monitor performance. Development for Release 3 will be completed in September 2022.

Current Action: Today's action is related to development for Release 4. The core focus for Release 4 of the Tolling Operation Management Solution (TOMS) is to develop, implement and ready a Reporting & Analytics Management domain within CTRMA. The Release 4 program will be organized and managed along five verticals (epics): reporting cache modeling, DPS reporting cache API DEX, public reporting DEXs, reporting &analytics, and Data Use Governance.

A Statement of Work (SOW) for Data Platform Release 4 was developed, in a format matching that outlined by Texas Department of Information Resources (DIR) and released to Deloitte Consulting LLP in July 2022. Deloitte responded to the SOW in August 2022. After additional discussions, Deloitte submitted an updated response in September 2022.

The total not to exceed cost for development of Release 4 is $796,782. This amount includes a 6% project contingency to cover unforeseen events such as extended testing efforts, new requirements, additional scope, etc. These project costs are outlined below.

Release 4 Pricing	$ 751,681
Project Contingency	45,101
TOTAL NTE AMOUNT	**$ 796,782**

Previous Actions & Brief History of the Program/Project: The initial contract with Deloitte was awarded by the Mobility Authority's Board of Directors in February 2021; the contract with Deloitte was approved by the Board of Directors in March 2021. Releases 1 and 2 were completed on schedule in September 2021. The Authority's Board approved a contract for Release 3 in September 2021. Two supplemental work authorizations were approved for this release which extended the project schedule and increased Deloitte's compensation. Release 3 development work will be completed in September 2022; testing will culminate in November 2022. If all goes well, then we will transition the Date Platform System to production on December 1, 2022. DPS will then become the system of record for the Authority's toll transaction data and revenue.

Financing: 183A Phase III Project funds

Action requested/Staff Recommendation: Staff recommends contracting with Deloitte Consulting LLP for continued development of a data platform with the scope identified as Release 4 through their contract with the Texas Department of Information Resources. Pursuant to Government Code Section 2054.0565 and the Mobility Authority Policy Code, use of the DIR contract with Deloitte Consulting LLP satisfies all competitive purchasing requirements.

Backup provided: Draft Resolution
Deloitte Consulting Release 4 Response
Data Platform Release 4 Scope of Work (SOW)
Data Platform Release 4 SOW Appendix E Pricing Form

**GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY**

RESOLUTION NO. 22-0XX

**APPROVING A CONTRACT WITH DELOITTE CONSULTING LLP FOR
CONTINUED DEVELOPMENT OF A DATA PLATFORM AND ASSOCIATED
TRANSACTION REPORTING TO SUPPORT TOLL TRANSACTION MANAGEMENT**

WHEREAS, Mobility Authority staff is developing a data platform to transition all toll transaction data processing and data management capabilities after the point of transaction creation from a third-party vendor to the Mobility Authority (the "Data Platform System"); and

WHEREAS, a Mobility Authority managed data platform will support new business capabilities such as external reporting, data analytics and a connection to the Texas Department of Motor Vehicles' datasets to allow better informed agency decision making; and

WHEREAS, by Resolution No. 21-018, dated March 31, 2021, the Board of Directors approved a contract with Deloitte Consulting LLP for the first and second releases of the Data Platform System to establish the data platform and create the routing and exchange processes; and

WHEREAS, by Resolution No. 21-059, dated September 29, 2021, the Board of Directors approved a contract with Deloitte Consulting LLP for the third release of the Data Platform System to support development for pricing and billing transactions, define how data governance is handled in the new processing schema, and identify the suite of reports necessary to account for the Mobility Authority's revenue and monitor performance; and

WHEREAS, the Executive Director has negotiated a scope of work for the fourth release of the Data Platform Project to develop, implement and ready a reporting and analytics management domain within the Mobility Authority that will identify the suite of reports necessary to account for the Authority's revenue and monitor performance which is attached hereto as <u>Exhibit A</u>; and

WHEREAS, Deloitte Consulting LLP has submitted pricing for the next phase of the Data Platform Project which is attached hereto as <u>Exhibit B</u>; and

WHEREAS, Deloitte Consulting LLP currently provides services to the State of Texas through Texas Department of Information Resources ("DIR") Contract No. #DIR-TSO-431; and

WHEREAS, pursuant to Texas Government Code Section 2054.0565 and Mobility Authority Policy Code Section 401.008, the Mobility Authority may use the DIR contract with Deloitte Consulting LLP to implement the next phase of the Data Platform Project; and

WHEREAS, the Executive Director recommends entering into an agreement with Deloitte Consulting LLP for continued development of the Data Platform Project in a total amount not to exceed $796,782.00, including contingency, through the DIR cooperative contract.

NOW THEREFORE BE IT RESOLVED that the Board of Directors hereby approves the scope of work and pricing for the next phase of the Data Platform Project which are attached hereto as <u>Exhibit A</u> and <u>Exhibit B</u>, respectively; and

BE IT FURTHER RESOLVED, that the Executive Director is authorized to enter into an agreement with Deloitte Consulting LLP in a total amount not to exceed $796,782.00, including contingency, through the contract with the Texas Department of Information Resources for continued development of the Data Platform Project.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of September 2022.
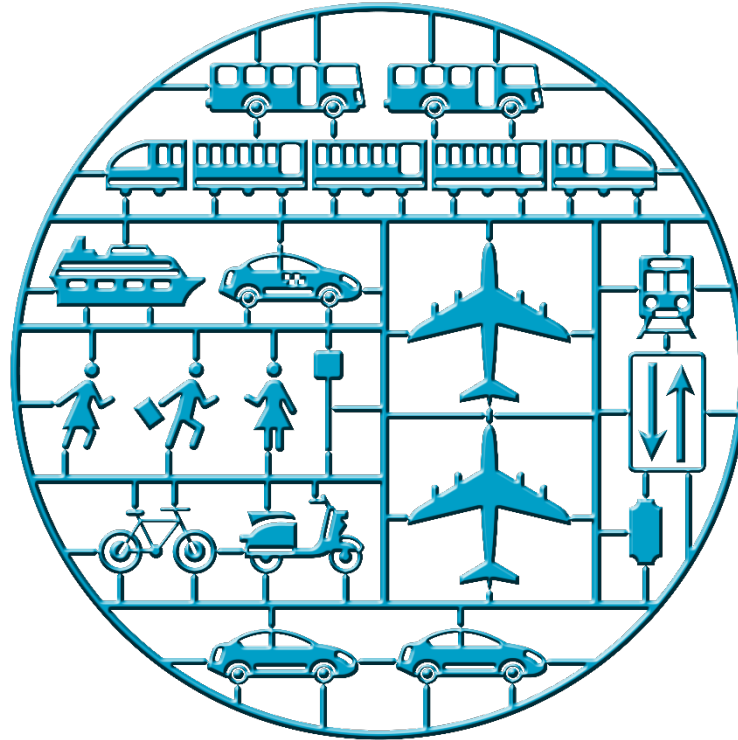
Submitted and reviewed by: Approved:

_____   _____
James M. Bass   Robert W. Jenkins, Jr.
Executive Director   Chairman, Board of Directors

Exhibit A

Deloitte.

CTRMA
Data Platform
Services

September 12, 2022

In response to the Data Platform Release 4 Requirements Statement of Work (SOW)

September 12, 2022

Central Texas Regional Mobility Authority
Attention: Greg Mack
3300 N IH-35, Suite 300, Austin, TX 78705

To the Central Texas Regional Mobility Authority Team,

Deloitte Consulting LLP (Deloitte) is pleased to submit this response to the Central Texas Regional Mobility Authority (CTRMA) Statement of Work for Data Platform Services Release 4 Requirements. Our innovative approach combines the scalable cloud architecture, advanced analytics capabilities, and digital transformation approach needed for CTRMA to achieve the next generation of enhanced transaction processing and back-office operations, while laying the groundwork for future releases and applications.

Tasked with managing the roadways that serve one of our country's fastest growing regions, CTRMA is at the forefront of deploying leading technology to maximize throughput. With that in mind, we have developed a transaction processing and back-office data management solution that will allow CTRMA to grow at scale by leveraging the full power of the innovative Google Cloud Platform (GCP):

- A highly flexible cloud platform that can be customized to meet your evolving needs and integrated with existing applications to serve as a centralized and inter-operable data repository
- No limit of scale or complexity, a GCP powered solution can handle any increase in transaction quantity as new toll booths are built and daily transaction volumes increase.
- Robust serverless application architecture on GCP to deploy rich user interface screens designed based on Human Centered Design principles
- Agile delivery for testing and evaluating new modules with high fidelity, low risk, and unmatched speed and depth of insight

Our work is uniquely supported by a depth of experience in the State of Texas and the transportation sector. Deloitte's transportation practice, consisting of 1,500+ experienced transportation professionals, offers a suite of end-to-end and managed services to help clients, like CTRMA, tackle today's toughest mobility challenges. We will also call upon our 40-year commitment to the State and our current work with Texas agencies, including program areas in Transportation, Health Services, and Public Safety as we strive to put Texans first!

We have been privileged to serve CTRMA for the development of Release 1, 2 and 3 functionality and look forward to an opportunity to continue to serve you to bring the vision of Data Platform Services to life. Please do not hesitate to reach out if you have any additional questions.

Thank you,

Uday Katira
Managing Director
Deloitte Consulting LLP
+1.407.619.4485
ukatira@deloitte.com

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1.0 Staff Capabilities

The objective of the data platform project is to transition all toll transaction data processing and data management capabilities after the point of transaction creation to an Authority-managed solution. A third-party vendor will continue to collect and create the toll transaction at the roadside, then pass the fully formed toll transaction to the data platform. Business logic and rules will then consume the transaction and route the payment request to either the Central United States Interoperability (CUSIOP) Hub or the Pay by Mail (PBM) vendor.

Deloitte will continue to bring Central Texas Regional Mobility Authority (CTRMA) our breadth of transportation sector expertise, cloud migration services, and next-generation data management solutions powered by Google Cloud Platform technology to deliver a comprehensive back-office solution to enhance CTRMA's end-to-end transactional tolling operations. With this enhanced solution, our team is committed to driving new cost efficiencies, improving reliability, and delivering new insights for decision making. We realize that a tolling transaction data management platform is just one key component of a larger technology modernization that has the potential to enhance the safety, responsiveness, and efficiency of transportation in Central Texas as well as maximize revenue generation opportunities by leveraging the power of data & analytics.

In the below response, Deloitte team presents our unique qualifications and capabilities we will bring to bear in this effort. Our experienced current team of experts is prepared to deliver value for CTRMA from day one, and we appreciate the opportunity to continue to work with you.

The Deloitte Team

| Mobility | 100% | 40+ Years | Experts | | Innovative | Leading Edge | Human Centered | Diverse |
| Industry Leader | State Delivery Track Record | Of Texas Experience | in Data Strategy and Cloud Migration | | Cloud Platform | Delivery of Agile and DevSecOps | Design Thinking | Digital Experience Platform |

1.1 Firm History

Deloitte Consulting. Deloitte is a full-service professional services organization providing consulting, financial advisory, tax, and audit services under a unified Deloitte brand. We have more than 286,000 professionals globally, generating annual global revenue of $59.3 billion. Deloitte is the largest professional services provider in the world based on global revenues and headcount. Our global reach—which includes a connected network of 34 member firms in more than 150 countries and territories—enables our client service teams to share knowledge of leading practices and trends observed worldwide.

In the United States, Deloitte Consulting is consistently recognized as a leader by Forrester, Gartner, and others in government services consulting due to the depth and breadth of our capabilities and our long history of successfully serving state governments across the country.

With **Deloitte and Google**, CTRMA will be served by the...

- Worldwide leader in Business Consulting Services
- Worldwide leader in Business Analytics Consulting and Systems Integration Service
- Worldwide leader in Artificial Intelligence Services based on capability and strategy
- Worldwide leader in Data and Analytics Service Providers for 6th consecutive year
- Global leader in IT Applications & Software Consulting
- Undisputed worldwide leader in industry Cloud Professional Services based on capability and strategy
- Undisputed AI/ML Leadership among Cloud Providers
- Industry Leader in Data Security Portfolio Vendors

Deloitte Consulting currently serves 47 of 50 states and has over 120 offices nationally. Having served U.S. state and local government clients for more than 50 years, the practice is committed to delivering consistent, high-quality results and helping states and local governments provide extraordinary services to their constituents.

Our alliances and strategic partnerships with the world's leading companies help Deloitte go beyond other strategic consulting firm services to form connections – and build solutions – matched to your unique ambitions. Deloitte has been recognized as Google Cloud's Services Partner of the Year for three consecutive years – a testament of our ability to provide exceptional service and help customers succeed by innovating, building, and delivering the right Google Cloud solutions for our clients. As a premier partner of Google, Deloitte has a proven track record of solving complex client challenges through large scale technology implementations. Read more about our alliance ecosystem here.

Mobility Industry Leader. Deloitte's transportation practice offers a suite of end-to-end service delivery and managed services to help our clients navigate the increasingly complex mobile ecosystem. We serve clients in over 56 cities globally with a network of 1,500+ experienced transportation practitioners. We bring market-leading industry knowledge, superior business transformation capabilities, and deep technical expertise to turn business challenges into opportunities. Deloitte supports transportation clients with developing strategic plans,

designing governance and business models, adopting new partnerships, and fostering a culture of innovation and a "can-do" mentality. We plan on using this unique experience to help CTRMA stay at the forefront of innovation in the mobility realm.

Please refer to Section 3 of our response to learn more about our delivery approach for advanced transportation technologies.

Figure 1: Representative Transportation Clients

Experts in Data Strategy and Cloud Migration. Deloitte has a proven track record of performing beyond the expected level of support by bringing fresh perspectives and the latest innovations. These abilities stem from our Cloud Engineering Practice. The Cloud Engineering Practice serves as the focal point for the development of our signature project delivery method for cloud projects – called Enterprise Value Delivery (EVD) for Cloud Engineering. Our EVD method provides tools, accelerators, samples, guidelines, and delivery strategies for Cloud Strategy, Cloud Migration, and Cloud Native Development – all of which are general types of cloud projects we have experience performing. EVD supports efficient project delivery while promoting consistency, quality, and value to clients. Using this approach Deloitte can assist CTRMA in adopting the latest technology, while integrating with legacy systems and existing business processes.

In addition to Cloud Implementation, we also provide Operate services at the heart of our clients' business, utilizing an integrated, comprehensive model that focuses on leveraging market disruptors and our broader expertise to drive innovation and value while also offering ideas on how to advise on and implement recommendations to transform their business. Our practice deploys a proven, process-centric approach based upon industry best practices, including CMMI and ITIL-based service processes.

Deloitte continues to make strategic investments in emerging technologies. We invested in the creation of Deloitte Digital to help clients across commercial and government.

Innovative Digital Transformation. Deloitte applies Human Centered Design (HCD) to problem solving. HCD puts people first. It's a methodology that drives toward solutions based on the voices and needs of users. It focuses efforts and investments on the most meaningful and necessary innovations. Behind every successful commercial customer experience is human-centered design. This is how commercial organizations are creating their customer experiences: with digital studio capabilities, following human-centered design methods that reimagine the holistic customer experience and then determine the role of different technologies (apps, web sites, smart devices) in delivering that experience.

This transformation offers the CTRMA the opportunity to create a citizen experience on par with modern retail and commercial services. Deloitte's innovative, cost-effective, technology

agnostic solutions for creating highly scalable web applications enable this user experience. Our solutions provide easy to use, engaging, responsive web applications that significantly improve the user experience and increase user adoption and are based on a flexible and customizable technical architecture.

Digital Capabilities: We believe everything is experience. Our design-driven approach to creating experiences helps us to understand client challenges differently, and to embed creative problem solving into everything we do; deepening client relations and encouraging new, more collaborative approaches to disruptive change.

By working within the principles of design-thinking, we can:
- Work with clients to create a new way of thinking, creating, and acting
- Uncover new strategic opportunities to engage with our clients and help them better serve their business, brand, and customers
- Encourage more continuous and productive collaboration across Deloitte

Whether your needs include an overarching digital strategy, a web or mobile experience, social content, CMS, or a digital ERP solution—or any combination thereof—we can work together to create a winning digital portfolio. To start, here are a few examples of techniques and/or components that make up our overall delivery strategy.
- Branding workshops
- Human Centered Design workshops
- Design system creation
- Modes and Mindsets
- Journey Maps
- Content analysis and strategy
- Heuristic evaluation
- Web and mobile experiences
- Web portals
- Design prototypes
- Digital reality

Our transformative and agile methods bind data, technology, and people in a coherent response to customer needs—iterating, always, for flexibility and effectiveness. From this you get real and meaningful insights into your customers—for improved experiences and smarter strategic investments.

Deloitte also offers a broad suite of capabilities to help clients harness the most value from their data to enable insight-driven decision making. We are recognized as a provider of data and analytics consulting services, focusing on assisting clients with business transformations that embed analytics into everything our clients do.

Data and Analytics Capabilities: Our US Strategy and Analytics practice, focused on government projects, employs over 5,000 practitioners. These practitioners include domain experts, solution architects, data engineers, data visualization and design experts, and data

scientists. Within the Strategy and Analytics practice, our industry-leading Analytics and Cognitive offering is focused on designing, delivering, and helping clients operationalize data and analytical strategies.

Deloitte is consistently recognized as the global leader in data and analytics services, bringing technology, data science, and cross-disciplinary subject matter expertise to complex mission-driven challenges, alliances with leading technology vendors, and a wide range of tools and capabilities.

Deloitte has been constantly ranked as a leader providing analytics services, as shown below. Third party analysts provide these rankings after exhaustive reviews with the vendors being assessed and interviews with past and current clients.

Figure 2: Magic Quadrant for Data and Analytics Service Providers

At the core of a world-class Data and Analytics solution is enterprise data established as a strategic asset. To increase trust and maximize usage of CTRMA's data requires careful design of data use governance, cyber security, architecture, and infrastructure. This foundation will enable a variety of Reporting/Analytics consumption capabilities, such as:

- Dashboards and Reports
- Self-Service Analytics
- Enterprise Data-as-a-Service for Public, External, and Internal customers

History in Texas: Deloitte has been helping clients in State of Texas innovate and transform for more than 40 years. Our firm has served as a trusted advisor to dozens of public sector clients in recent years, including the Texas Department of Motor Vehicles, Department of Transportation, Health and Human Services, Department of Emergency Management, as well as several local government and higher education clients. We are also honored to call CTRMA a strategically positioned visionary client in the Central Texas Region.

Our services for the State range from contract and performance audits, security risk assessments, and licensing projects, to complex large-scale system implementations. Throughout this work, our commitment to the State of Texas has been paved with success, boasting no failed projects. Even when Deloitte has taken over projects, like we would be for the Data Platform Services implementation, from other vendors, we have been able to smoothly transition to achieve successful outcomes.

To serve the state, Deloitte has more than 1,000 Deloitte professionals based in our Austin office and an additional 5,000 employees spread throughout our Dallas, Houston, Fort Worth, and San Antonio offices. Deloitte has consistently been recognized as a leading employer in Texas, with an active engagement in the community, and hundreds of locally educated, trained, and hired employees working every day to assist Public and Private employers in the region.

Company Experience

Deloitte is committed to Texas

40 YEARS
Experience serving Texas clients

TxDMV Motor Vehicles	Public Safety
Criminal Justice	Texas A&M University

7 Offices
Deloitte has 7 office locations in the state of Texas

6,300 Team Members
Deloitte Professionals serving the state of Texas

23,000 Hours
Of Deloitte Community Service in Texas every year

90 Universities
In state employees come from 90 Texas based universities and colleges

10M+ Texans
Over 10 million Texans use Deloitte integrated information systems

100+ Companies
Working experience with over 100 companies in Texas

Recent Texas Government and Higher Education clients

- Department of Information Resources
- Criminal Justice Department
- Texas A&M University
- Texas Facilities Commission
- Texas Attorney General

- Texas Environmental Quality
- Texas Comptroller
- Teacher Retirement System
- Employee Retirement System
- Department of Transportation

- Texas Lottery
- Department of State Health Services
- Parks and Wildlife
- University of Texas
- Department of Insurance

Figure 3: Deloitte Presence in Texas

Our Alliance partnership. Deloitte and Google have built a meaningful alliance partnership that generates enormous value for our clients, with the potential to do the same for CTRMA. As a Google Premier Partner in Data Analytics, Machine Learning, and the Advanced Solutions Lab, Deloitte is the professional services firm with the most Google Cloud Platform (GCP) certified, trained, and specialized employees and resources in the world. Deloitte has over 1,800+ trained GCP practitioners and 475+ Google Certified Professional Big Data Engineers and Cloud Architects. Of our 250+ practitioners specializing in Big Data, Analytics, and AI/Machine Learning, more than 50 are specifically trained on Google Cloud. Deloitte and

Google are also co-investing to incentivize and accelerate Google Cloud engagements and form a dedicated commercial team for expedited delivery. As a result of Deloitte's commitment, Google Cloud Services named Deloitte the 2017, 2018, 2019, 2020 and 2021 Partner of the Year.

Our partnership has generated a significant competitive advantage for our Government and Public Sector clients. Serving as a systems integrator Deloitte provides proprietary analytics solutions, systems integration strategy, business process and technology know-how. We work with our clients to thoroughly understand solution requirements and the desired outcomes, which is then used to identify which of Google's expansive tool sets are best suited for the use case.

By combining our industry expertise, Deloitte's strategic visioning, and Google's innovative technology we can successfully accelerate any digital transformation. Our collective capabilities range from Application Services to Analytics and Machine Learning; however, we call upon our combined presence serving over 80% of the largest commercial and public sector organizations in the world to provide customized and scaled solutions that are best suited for our client's unique organizational goals. Our recent delivery successes include many major agencies across Texas as well as CTRMA peers in the toll road industry.

Project Spotlight...

- The Colorado Department of Transportation (CDOT) approached Google with the need to **fuse vast amounts of data from siloed sources** to **enhance operational excellence** in safety, mobility, infrastructure, planning, and operations

- In response Google created the CDOT Advanced **Data Analytics Platform (ADAP)** and **Real-Time Data Hub (RTDHub),** a Google Cloud based platform that enables **infinite scalability, speed, storage, and processing capabilities** for CDOT to solve each of their analytics use cases

COLORADO
Department of Transportation

Our Value Proposition. Together, Deloitte and Google are poised to provide a unique combination of best-in-class technological capabilities and systems implementation expertise. By bringing together our transportation practices we are committed to delivering the best of our capabilities to CTRMA, which has unique requirements for data management and data architecture services as it plans on upgrading and revolutionizing its toll transaction management system. We envision this data platform as one that can be integrated with existing business capabilities and future modules alike and will make it possible for CTRMA to easily share data with other transportation partners in the region.

In the future as the data platform expands to incorporate more business functions and mobility applications, GCP's ability to quickly test and integrate new modules will be critical for CTRMA's broader ambition. By offering scalable compute resources and centralized data warehousing, GCP offers CTRMA cost-effective methods for integrating new modules as requirements evolve and additional microservices are introduced.

Deloitte bring deep experience completing complex system integrations, developing major AI/ML projects, and instilling the change management needed for agency- wide adoption of said projects. Previously, Deloitte and Google had collectively assisted city governments and transit agencies implement analytics and IoT-based tools including the Colorado Department of Transportation (CDOT), Chicago Department of Transportation (CDOT), and the City of

Memphis. These tools have proven capable of leveraging cloud-based data management solutions and analytics to power mobility-related business functions in a similar fashion to what is required of CTRMA's data platform solution.

1.2 Personnel and Team

Organizations don't provide service—people do. What really makes a difference are the people who serve you and their commitment to your success. Deloitte have worked hard to identify and build a team of highly qualified and committed team of professionals who align with your culture, thoroughly understand the expectations of implementing transactional data platform services and can translate that knowledge into a no surprises approach. As you would notice, we have leveraged most of our team delivering Release 1, 2 and 3 of Data Platform Services to provide continuity of the knowledge gained and additional skills to the team, as needed.

Uday Katira will continue to serve as the Project Technical Director and alongside Satheesh Rao as Engagement Lead. They will lead a team that has the requisite technical and subject matter knowledge, and the first-hand experience needed to serve CTRMA.

Resumes for Uday, Satheesh, and our proposed Team Leads are included below in addition to the rest of the Deloitte team.

Figure 4: Proposed Project Team Organization

1.2.1 Resumes of Key Personnel

Uday Katira Deloitte Consulting LLP	Role: Project Technical Director	21+ Years of Relevant Experience

Relevant Experience:

Uday Katira is a Managing Director at Deloitte Consulting LLP and is the leader of the firm's Strategy and Analytics US Delivery Center. He provides over 20 years of Technology Consulting experience and over 13 years of project and program management experience serving clients in both the public and private sectors. Uday's expertise lies in delivering large-scale end-to-end transformational initiatives that enable clients to unlock business value by transforming their information assets into actionable insights for driving operational and organizational efficiencies. His expertise spans enterprise data management, business intelligence and analytics, robotics automation and artificial intelligence across on premise and cloud implementations.

Uday's achievements in the field of enterprise data architecture have not gone unnoticed with publications, awards, and speaking engagements in the field including:

- "'Modeling the future Enterprise Data Architecture: A vision 2020" – The winning entry of Informatica Architect's Challenge: Design the Enterprise Architecture of 2020
- "Agile BI Toolkit: Delivering Insights with Agility" – Published whitepaper
- "'Big Data Era: Has the existing business model of insurance industry become invalid' – Presentation delivered at Unicom Big Data Conference
- "How can Post-digital Technologies Reshape Insurance Industry" - Presentation at Deloitte War of Ideas Cross Functional Contest
"Ten Commandments of Managing Large Software Projects" – Presentation at the 4th Annual International Project Management Leadership Conference organized by QAI Asia

Representative Project Experience:

Engagement Lead – Texas Department of State Health Services (DSHS)

In order to address various impacts of the COVID-19 pandemic and make critical decisions, the State of TX and DSHS requires reliable data regarding the spread of infection in the state. To address this need, Uday is leading a team to establish the IDDI analytics platform, and Data Governance Program that will serve as the single cloud source of truth on the cloud accessible for all reporting, analytics and data science needs for Infectious Diseases.

As the Engagement Lead, Uday has worked closely with the key client stakeholders to assess the agency's current pain points, blueprint the future state architecture, and manage the delivery of the project over the course of multiple 2-week long agile sprints. He is constantly collaborating with IT teams to understand perspectives around existing data quality and systemic issues, data

Uday Katira Deloitte Consulting LLP	Role: Project Technical Director	21+ Years of Relevant Experience

ingestion strategies, and data warehouse design. Uday's ability to coordinate has helped facilitate the development of the highly critical solution.

Delivery Quality and Risk Management Lead – Department of Health and Human Services (HHS) The client is the US government's principal agency for protecting the health of all Americans through the provisioning of essential human services. Uday served as the program lead for two highly critical development projects at HHS, the Financial Business Intelligence System (FBIS) and Unified Financial Management System (UFMS), which aim to create a unified environment for HHS financial management business functions.

The FBIS project is a Data Warehouse project that is poised to build an information driven and collaborative financial management environment where stakeholders at all levels of the organization have an efficient way to access timely, accurate and relevant information required for measuring performance, increasing transparency and enhancing decision making. UFMS is a core accounting system to maintain Federal Financials leveraging Oracle E-Business Suite. The purpose of this engagement was to maintain existing FBIS and UFMS systems while also offering significant business value through periodic addition of new features and functionality on an on-going basis.

In his role, Uday was responsible for coordination with key HHS stakeholders on the monitoring of project status, proactive identification of risks, development of risk mitigation plans, and performance reviews of the technical on-prem / cloud hybrid architecture. Uday also managed the delivery of technical products and ensured that quality was up to HHS's standards.

Employment:
- Deloitte Consulting LLP (2007 – Present)
- Infosys Technologies Limited (2000 – 2007)

Education:
- Bachelor of Engineering, Gujarat University, India

Certifications:
- Project Management Professional (PMP), Certified Software Quality Analyst (CSQA)

Satheesh Rao Deloitte Consulting LLP	Role: Engagement Lead	20+ Years of Relevant Experience

Relevant Experience:

Satheesh is a Managing Director with Deloitte and has over 20 years of IT experience in designing and implementing data warehouse systems for both public and private sector agencies. His areas of expertise include Data Warehousing, Business Intelligence, Database Architecture, Data modeling, Administration and Custom Application Development. In his role as a Solution Manager Satheesh has extensive experience with project management, requirement gathering, design, development, testing, troubleshooting, implementations, and production support. Since August of 2020, Satheesh has served as the Lead Data Architect responsible for the Texas Department of State Health Services (DSHS) handling the primary database used for COVID-19 reporting, analytics, and data science. His role in this critical project further proves Satheesh's commitment to delivery excellence for the State of Texas.

Representative Project Experience:

Lead Data Architect – Texas Department of State Health Services (DSHS)

To address various impacts of the COVID-19 pandemic and make critical decisions, the State of TX and DSHS requires reliable data regarding the spread of infection in the state. To address this need, Satheesh is leading a team to establish the IDDI analytics platform, and Data Governance Program that will serve as the single cloud source of truth on the cloud accessible for all reporting, analytics and data science needs for Infectious Diseases.

As the Lead Data Architect, Satheesh is responsible for development and support of the IDDI Data platform to ingest, cleanse and transform the COVID Lab, Case, Contact Tracking, Fatalities, Hospital, School line and other health metrics data for reporting purpose.

Delivery Manager – Commonwealth of Pennsylvania, Department of Human Services (DHS)

DHS needed greater transparency into their data to better equip them to discover business insights and find the answers to their most daunting questions surrounding program compliance, services and support, caseload management, collections, expenditures, and child assessments. Satheesh led the implementation of several Enterprise Data Warehousing (EDW) and Operational Data Store (ODS) initiatives to create the foundation needed by DHS to access their data more intuitively. As part of the effort, Satheesh conducted requirements gathering, system design, project management, architecture design, and quality assurance to deliver a production-ready solution for DHS.

Managed Analytics Delivery Manager – Exelon

Exelon Corporation is the nation's leading competitive energy provider. As a Delivery Manager, Satheesh was responsible for leading an application maintenance support team. The production support environment covers Hadoop based analytics application solutions across multiple business domains like GRID, Customer, and Customer Data Management. He was also responsible for setting up the initial application maintenance and support processes and management of the overall technical delivery quality, risks and issues using qualitative and quantitative review methods.

Satheesh Rao Deloitte Consulting LLP	Role: Engagement Lead	20+ Years of Relevant Experience

Employment:
- Deloitte Consulting LLP (2004 – Present)
- Probys (2002 – 2004)
- HCL Technologies (2000 – 2002)

Education:
- Master of Computer Applications, Bharathidasan University, India

Certifications:
- Amazon Web Services (AWS) Cloud Practitioner
- Azure Cloud Foundation
- Project Management Professional (PMP)
- ITIL – V3 MALC (Expert)
- Oracle Certified Professional (OCP) Database Administrator
- Microsoft Certified Professional (MCP) Designing and Implementing Databases

Sidd Jyothi Deloitte Consulting LLP	Role: Project Manager	20+ Years of Relevant Experience

Relevant Experience:
Branded Analytics Technology PM/Lead/Solution Architect with hands-on DB/BI/Modeling/Design/Development and full lifecycle expertise in technical leadership and implementation of large-scale Enterprise application systems. Currently providing Deloitte consulting services in Tolling Industry (State of Texas–CTRMA) on business process automation for data collection, interoperation on Google Cloud Platform, expertise with Health & Oracle BI ERP systems, data architecture and governance, data integration, metadata management, data visualization, advanced data analytics, IT Modernization, agile methodology, program/project management. Certified AWS Solution Architect & Professional Scrum Master (PSM).

Experienced in exploring the emerging technology trends with cloud computing solution architecture stacks of Google (GCP), Oracle and Amazon Web Services (AWS). Manage capacity planning, release planning, and close coordination with client, infrastructure, and various process team managers. Manage all aspects of the project SDLC cycle phases across functional and technical domains.

Manage work plan and staffing plan, coordinate with the project team, and monitor project status. Proactively identify project risks and develop risk mitigation plan. Manage overall project delivery risks, issues, and track mitigation plan for resolutions. Lead and present project status to the program engagement leadership and stakeholders

Representative Project Experience:
Project Manager/Technology Lead – CTRMA DPS Austin, Texas
Lead, manage and enable the tolling operations of CTRMA business processes on Google cloud platform and services. Goal is to enable CTRMA with a first of its kind Google cloud-based platform (DPS) solution for data collection, data exchange and data analytics. Providing day-to-day leadership and managing a team of 12 Deloitte team practitioners to architect, design and develop Data Platform Service (DPS) solution for consuming data on tolling products from Roadside Vendor (TCS), interoperate with CTRMA business entities of CUSIOP Hub and PBM for transaction to payment reconciliation and disposition.

Managing the full lifecycle of project development with an agile scrum based bi-weekly sprint framework to incrementally deliver Release 1 & 2 solution artifacts. Responsible for managing the sprint plans, progress of planned activities and daily scrum call communication of the project status with DPS CTRMA client leadership team.

Sidd Jyothi Deloitte Consulting LLP	Role: Project Manager	20+ Years of Relevant Experience

PM / BI Lead – FBIS O&M | HHS ASFR, Office of Secretary, Washington DC
Led and managed FBIS Enterprise client O&M operations, application support and development serving five major HHS Agencies of CDC, FDA, IHS, PSC and NIH. Actively lead and manage O&M staff of 18 practitioners, change management including planning and release activities for enterprise accounting centers. Lead O&M team in implementing periodic major and minor releases per master release calendar. Provided day-to-day leadership for the FBIS team, drive integration across FBIS, CFRS, and UFMS work streams; Accountable for all delivery outcomes across FBIS; Management of day-to-day operations of large scale EDW system.

Responsible for all O&M (ETL/DB/BI) activities related to FBIS: Instance and release planning, scope, schedule, risk management and execution (SIT, UAT, Production); Review and delivery of Master Release Calendar, RTM deliverables, SOP documents, Y/E activity planning schedules. Managed and coordinated with team leads to resolve issues that impact project delivery schedule. Managed coordination with Organization Change Management team for project release and training communication to the FBIS community. Responsible for O&M staffing plan, talent acquisition for project team, coaching and enabling new, junior members of the team.

Employment:
- Deloitte Consulting LLP (2010 – Present)
- ICS-Nett Inc (2008 – 2010)
- InfoPro Inc (2006 – 2008)
- Oracle Corporation (1998 – 2006)
- Metro Information Services (1996 – 1998)

Education:
    Masters Environmental Engineering, Wayne State University

Certifications:
- AWS Solution Architect Associate
- Professional Scrum Master
- BI Project Management Professional / Deloitte University
    Oracle-Deloitte alliance sponsored Enterprise Fusion Middleware BI Trainer

Olu Olaniyan Deloitte Consulting LLP	Role: GCP Infrastructure Lead	20+ Years of Relevant Experience

Relevant Experience:
Olu Olaniyan is a 3x Certified Google Cloud Solutions Architect and Specialist Master at Deloitte Consulting LLP. He has over 20 years of network engineering experience and is an expert in designing and managing hybrid and public cloud solutions for government and commercial sector IT infrastructures. Olu is well-versed in developing proof-of-concepts to support the best and most innovative cloud adoption strategies for individual clients in accordance with their unique requirements and gathering buy-in from all key stakeholders for a successful transition to the cloud.

Representative Project Experience:

Google Cloud Infrastructure Lead – Central Texas Regional Mobility Regional Authority (CTRMA)
Olu has been responsible for architecting, designing, and building the CTRMA Data Platform System in the Google Cloud environment.
As the GCP lead, Olu has been instrumental in achieving the objectives of phases 1 and 2 through extensive engagement sessions with the CTRMA counterparts and stakeholders. He also leverages the Deloitte and Google Cloud alliance partner relationship in delivering a scalable, secure, and holistic solution to support CTRMA.
In his role, he is also responsible for providing recommendations on integration strategy, new GCP resource assessment, and supporting the development and test environments on a day-to-day basis.

Google Cloud Solutions Architect – United States Postal Service (USPS)

USPS was interested in developing a multi-cloud and hybrid-cloud environment to support artificial intelligence (AI) platform workloads and data warehouse applications. As the lead Google Cloud Solutions architect Olu was responsible for leading stakeholder engagement in assessing on-premises environment elements and strategizing integration efforts and supporting cloud infrastructure cost projections and utilization scaling.

Olu Olaniyan Deloitte Consulting LLP	Role: GCP Infrastructure Lead	20+ Years of Relevant Experience

In his role, Olu worked hand-in-hand with the engineering teams to assess technical requirements, stand up the proof-of-concept environment, and validate the infrastructure. Furthermore, Olu built an AI pipeline to support high volume data ingestion and ETL workloads. He also evaluated the on-premises data center infrastructure pertaining to data lake resources, networking, and security in support of integration with legacy systems. Throughout the engagement Olu conducted cloud consumption forecasting by monitoring consumption weekly and monthly to justify the cost savings provided by the developed solution.

Principal Network Engineer - National Aeronautics and Space Administration (NASA)
Olu played a key role in global infrastructure augmentation and enhancements related to NASA's mission network total life-cycle support. He was responsible for evaluating NASA's cloud infrastructure technology and for providing feedback pertaining to networking of on-premises infrastructure as a service (IaaS) NASA project. Olu continuously refined requirements, designed, tested, and implemented proof-of-concept solutions for strategic NASA infrastructure projects. He coordinated the change management and stakeholder buy-in necessary for the successful deployment of each project including interactions with h Mission Projects Communication Service Representatives, Mission Security Team, Mission Service Managers, Mission Systems and Operations Teams.

Employment:
- Deloitte Consulting LLP (2019 – Present)
- NASA – National Aeronautics and Space Administration (2014 – 2019)
- AT&T (2012 – 2013)
- Juniper Networks (2010 – 2012)
- Verizon Business (2005 – 2009)
- NTT (2000 – 2005)
- Zillacast (1999 – 2000)
- Highway 1 (1998 – 1999)

Education:
- MBA in International Business and Finance, George Washington University
- Bachelor of Science, Strayer University

Certifications:
- Google Cloud Professional Cloud Security Engineer, Google Cloud Professional Data Engineer, Google Cloud Professional Cloud Architect

Kumar Murugappan Deloitte Consulting LLP	Role: Reports Lead	15+ Years of Relevant Experience

Relevant Experience:

Kumar Murugappan is a Solution Architect at Deloitte Consulting LLP in the Strategy and Analytics offering portfolio. Kumar brings 17 years of experience in Information Technology and around 15 years of experience in data warehousing and business intelligence systems. His areas of expertise include Data Warehousing, Business Intelligence, Data Visualization, Data Modeling, Data Quality Analysis, Data Profiling, Data Cleansing and Master data management. He has managed and lead projects through understanding business requirements, system requirements, converting system requirements to technical design, architecting business intelligence solutions, integrating information from multiple sources and various COTS products.

He has experience working in large scale data analytics implementation using Tableau, QlikSense, Qlikview, Looker, Power BI and Cognos. Some of the major customers include PA Turnpike Commission, Commonwealth of Pennsylvania Department of Human Services, Department of Labor and Industries, General Electric Corporate, and Connecticut State Board of Regents.

In his current role, Kumar functions as the Reporting Lead/Architect for the PA Turnpike Commission – focused on leading the business intelligence and data analytics program for PA Turnpike Commission that is responsible for maintaining the Interstate Highway. Kumar brings a strong blend of business knowledge, and technology experience of state government operations including Transportation, enterprise IT, Health and Human Services, and Labor.

Representative Project Experience:

Solution Architect - Business Intelligence and Data Analytics Program for PA Turnpike Commission

Kumar was leading the Business Intelligence and Data Analytics team for a PA Turnpike Commission that is responsible for maintaining the Interstate highway. He has worked with 8+ departments and their stake holders to understand the Strategic Performance Goals and Objectives of the Agency. Responsible for technical architecture, design, development, and delivery of analytics solution related to their Traffic Engineering and Operations. He has led cross functional teams through all phases of multiple Qlik sense development process including Discovery and planning, Requirement's definition, User Interface Design, Report and Dashboard Development, User Acceptance Testing, Deployment and Training.

He has facilitated daily scrums to manage resources and develop sprints from requirements gathered from key stakeholders. Designed 40+ scorecard and detailed dashboards to monitor and support the decision making of the strategic performance goals and objectives. He has worked with Data Science, Research, IT, and business units to assess and incorporate demographic, geographic, weather, traffic, speed, and other data sources for analytic benefit. He was responsible for planning and executing the Qlikview and Qlik Sense infrastructure upgrade activities by working closely with multiple development teams across the enterprise.

Kumar Murugappan Deloitte Consulting LLP	Role: Reports Lead	15+ Years of Relevant Experience

Solution Architect - CWDS Analytics Solution for Department of Labor and Industries
Kumar was a Solution Architect leading the modernization of Business Intelligence platform for the Commonwealth of Pennsylvania, Department of Labor and Industry. He managed the end-to-end project execution including project planning, risk assessment, and timeline management. Reviewed DLI's current reporting requirements, analyzed existing datasets, and laid out the BI architecture in Power BI for dashboard and self-service reporting. He has conducted several requirements and design sessions with various program groups within DLI to identify and define key performance indicators, business logic for each KPI, and report and data level security.
He has worked with DLI stakeholders designing and implementing 6 new dashboards in Power BI to help improve decision making, insight, and transparency into key workforce related programs. Trained DLI leadership and staff on the features and functionality of Power BI and established a Power BI Administrator Guide and User Guide to assist clients with dashboard deployment.

Solution Architect - DHS Interactive Solution for Department of Human Services
Kumar has worked closely with stakeholders across 11 program offices, the DHS executive reporting group and the DHS technical team (BIS) to define requirements and design a holistic solution consisting of 19 dashboards and almost 200 different indicators. Helped his customer in evaluating the market leading Business Intelligence tools such as Tableau, QlikView, and QlikSense based on various factors like ease of use, self-service features, scalability, data preparation and advanced analytics features. He has designed, developed, and deployed interactive analytical dashboards using all three tools. Created multilayer architecture in Tableau by decoupling Data Source Layer (TDS/TDSX) and Presentation Layer (TWB/TWBX). Involved in troubleshooting, performance tuning of Tableau reports and resolving issues within Tableau Server. Served as Subject Matter expert to assist the BI Team in learning and resolving Tableau development roadblocks. Designed 2-tier and 3-tier architectures and created QV data model by joining data from multiple sources. Created Qlik Extensions for visualizing parallel sets using D3 visualization library.

Senior ETL Specialist - Business Analytics Shared Services for Department of Human Services
Kumar was an ETL Specialist leading a team of 11 in developing the Data Warehouse system for OCYF program office under Department of Human Services. Responsible for designing, developing, and delivering a data warehouse reporting solution comprising of ad hoc reports, interactive dashboards, OLAP cubes and federal reports. He has developed ETL technical architecture, including Data Quality, Metadata Management and Data Migration using enterprise defined ETL Framework. Conducted impact assessment and determined the size of effort based on requirements. Defined and implemented ETL development standards and procedures. Resolved difficult developments issues, identified bugs and implemented/recommended solutions to developers. During this period, he has acted as a liaison between Data Warehouse, Infrastructure Shared Services and Application Development

Kumar Murugappan Deloitte Consulting LLP	Role: Reports Lead	15+ Years of Relevant Experience

teams.

Employment:
- Deloitte Consulting LLP (2013 – Present)
- SOHO Solutions (2012 – 2013)
- Tata Consultancy Services (2005 – 2012)

Education:
- Master's in information technology, Anna University, India
- Bachelor of Engineering, Madurai Kamaraj University, India

Certifications:
Certified Qlik Data Architect, Certified Qlik Business Analyst, ITIL Foundation in IT Service Management, License - GR750450022KM, Apache Cassandra and DataStax Enterprise Developer Associate, Scrum Alliance - Certified Scrum Master, License 000664462

1.2.2 Resumes of Representative Personnel

In addition to the key personnel listed above, Deloitte and Google bring a deep bench of 1,500+ systems integration, cloud architecture, software development, and analytics practitioners with the unique skills required to execute the development of data platform services for CTRMA. The resumes of such representative personnel can be provided on request for your reference.

1.3 Corporate address

The services being proposed under this solicitation response will be delivered by Deloitte Consulting LLP headquartered at the following corporate addresses.

Deloitte.

Address	30 Rockefeller Plaza, New York, NY, 10112-0015
Telephone Number	212-492-4000
Fax Number	212-489-1687

1.4 Other Office Locations and Addresses

Deloitte has office locations located conveniently in downtown Austin. Deloitte has other locations throughout the state from where we can source specialized team members in cities including Dallas, Houston, San Antonio, and Fort Worth. For a full list of our office locations throughout the world please refer Deloitte Global Office Directory .

Deloitte.

AUSTIN, TX	
Address	500 W. 2nd St., Suite 1600, Austin, TX, 78701
Telephone Number	512-691-2300

1.5 Summary of the Firm's Experience providing services for governmental entities from 2017-to date

Deloitte has unmatched experience managing large-scale technology implementations, modernizations, and other strategic initiatives across federal and state government. More specifically, we have provided ongoing support to the State of Texas in improving public safety, developing the state's, solving complex business issues, and upgrading outdated technology systems to provide higher quality service at lower cost to taxpayers.

The figure below provides the details of several of our current engagements for Texas State agencies along with the services provided.

Clients	Project	Dates	Project Duties and Outcomes
Office Of Attorney General (OAG)	Data Analytics Self-Service Platform (DAS2) & Modernization of Data Conversion	2021 - Present	Deloitte is supporting OAG's Data Modernization Initiative which includes modernization and expansion along with migration to cloud platform. • OAG's platform integrates data from the legacy mainframe and other external files related to Child Support cases. • This platform will serve as the unified repository for the data from disparate sources while offering access to those data through dashboards, standard reports, and ad hoc analytics tools. • As part of this team is bringing 200+ mainframe objects, user feedback data from Qualtrics and other external data to the platform to enable customer-centric analytics. • Deloitte is also developing new data pipelines using AWS Glue to reduce manual processing and dependency on Mainframe and SAS. Also enabling the interactive dashboards and self-service analytics capabilities using QlikSense and SAS Viya. Additionally, to support the DevOps, data pipeline and Database deployments have been automated leveraging the Liquibase and AWS Cloud Formation technologies.

📋	Texas Department of Information Resources	Texas.gov	2017 – Present	**Web Portal Modernization** • After taking over from a previous vendor, Deloitte is helping DIR with large-scale effort to modernize the way citizens interact with the Texas state government by creating an AWS backed secure, user-friendly, easy-to-access web portal for all state government services s • After helping DIR migrate to the cloud, the new portal has accumulated over 850k monthly visits and 1M monthly transactions • 90% of Texans have provided satisfactory reviews of the new website since go-live.
				My Government My Way • The My Gov My Way project or MGMW is focused on enhancing the constituent digital experience. The new digital assistant that will help citizens interact with government more easily and more seamlessly • The initial release is limited to Texas Department of Licensing and Regulations constituents who hold a massage therapy or massage therapy instructor license. Through the MGMW application, these constituents can setup their personal MGMW account, renew their massage therapy or massage therapy instructor license, as well as manage their credit cards to make a payment through the application.
📋	Department of Public Safety	SPART-N Analytics	2017 – Present	**Application Development Services** • Deloitte is currently designing and developing an advanced analytics solution for Intelligence and Counter Terrorism to understand relationships and establish correlations between data aggregated from disparate sources • The solution has effectively reduced the time spent on manual data aggregation by 80% and enabled staff to spend 100% time on investigative analysis

DSHS – Public Health Analytics	Data Integration & Reporting Platform for State Health Analytics	2020-Present	• Deloitte stood up a modernized cloud technology-based State Health Analytics Platform (SHARP) as well as the data integration platform (IDDI) to streamline and analyze infectious diseases and mortality statistics to support 50 multi-Agency and external stakeholders during the government mandate to address the emergency situation arising from Covid-19 Pandemic. • DSHS users now are enabled with reliable timely access to data to support and inform public health decision making.
Central Texas Regional Mobility Authority	CTRMA DPS Project	2021 -- Present	DPS Data Platform • Deloitte stood up DPS Data Exchange platform to automate the Tolling Transaction business operations and TOMS application platform to manage and control interoperable transactions with external vendors of TCS, IOP Hub and PBM • Deloitte has successfully completed the UAT events with external vendors and is currently supporting the internal End-To-End integrated testing in preparation to operate in production environment early Oct 2022

2.0 Project Work Plan

2.1 Project Overview

A description of key activities and milestones.

Deloitte as the current incumbent contractor of Release 1, 2, & 3 development work, is currently supporting CTRMA IT team with integrated End to End (E2E) testing of DPS and TOMS application systems. This significant milestone is backed up by successful completion of UAT events on DPS interoperation with external vendors of Kapsch, CUSIOP Hub and PBM systems. In addition, the Deloitte team has successfully architected TOMS application solution and completed the UAT events to enable CTRMA IT team to securely administrate, configure, manage, and control the transactions stored, processed, and interoperated in DPS platform.

As CTRMA begins the E2E milestone, Deloitte is wrapping up the planned release 3 backlog items in preparation for the Parallel Operations Testing in production (POT) milestone, anticipated to begin early In October 2022. Deloitte and DPS IT team are preparing the DPS/TOMS production environment, including the DPS infrastructure, network, security to support data exchange interoperation with external vendors.

To this effect, Deloitte has conducted successful interactive UAT demonstrations of the:

⇨ DPS interoperation capabilities for small and high-volume transaction consumption, payment routing and processing, ingesting periodic high volume TVL and LVL datasets, performing automated lookups against TVL/LVL datasets for statuses, queuing of transactions based on the workflow processing status, billing of transactions for invoice data interaction with PBM external vendor, producing verifiable functional outcomes per ICD specifications and CTRMA business requirement.

⇨ TOMS application system to

- o Search, view, filter and download transactions as well as support editable transaction attributes of Workflow Status, Payment Path, Amount and Axle per business rules.

- o Create, update, and configure internal management controls on transaction products, active and passive discount programs, and organizations,

- o Create billing configuration to manage the aggregated bill scenarios and parameters. Support editing of 'Bill Payment Path' for business scenarios involving re-routing of 'PBM to Hub' or 'Hub to PBM'

- o Support creation of 'Hold and Release' transaction capabilities to enable CTRMA exercise control on interoperation with external vendors to manage daily business situations and data realities.

DPS & TOMS application platform solution is well positioned for further expansion as requested in Release 4 for Reporting and Analytics requirements:

- o To extend the DPS platform with Reporting Cache capabilities on BigQuery Google Service
- o To extend the DPS platform with DEX API solution to make the data conducive for reporting via Looker services
- o To extend the platform solution with Reporting & Analytics capabilities
- o To extend the DPS platform with DEX API to support three channels of public reporting
- o To extend the TOMS application platform with Data Use governance capabilities

2.2 Assumptions and Dependencies

High-level scope, assumptions, and dependencies of the project.

Based on the Release 4 SOW requirements and our experience of delivering Release 1, 2, and 3, we have identified following high-level scope, assumptions, dependencies and out of scope items:

High level scope:
- **Reporting Cache Modeling**
    - o Discover and document future state reporting schemas, entities & relationships (ERDs), and data entity catalog
    - o Design, model, test, and deploy initial Reporting Cache model(s)
    - o Scoped in 8 data groups for modeling:
        - Roadside,
        - DEX,
        - Transaction,
        - Product,
        - Pricing,
        - Discounts,
        - Billing,
        - Financial
    - o Iterative modeling required for Reports would be handled as part of reporting sprints, with as much modeling upfront as possible in the initial phase
- **DPS Reporting Cache API DEX**
    - o Identify and map required DPS OLTP data entities and attributes to Reporting Cache
    - o Document, Design, build, test, and deployment of initial DPS Reporting

Cache API DEX

- o Iterative design, build, test and deployment of DPS Reporting Cache API DEX would be handled as part of reporting sprints

- **Public Reporting DEXs**
  - o Identify the use case for the Public Reporting API DEX for a single channel / single dataset
  - o Design, build, test and deployment of the Public Reporting API DEX API
  - o Identify the use case for larger collection of the same dataset to be provisioned through Public File Folder DEX
  - o Design, build, test, and deploy Public File Folder DEX as well as file management schedule
  - o Identify the use case for even larger collection of the same dataset to be provisioned through Public Reporting GitHub DEX
  - o Design, build, test, and deploy Public Reporting GitHub DEX and file management schedule

- **Reporting & Analytics**
  - o Review and understand report prototypes and related requirements documents
  - o Develop, test, and deploy Semantic Model including Views, Dimensions, Measures and Explores
  - o Review and Advise CTRMA on Looks and Bundling of Looks on a Dashboard
  - o Configure Reporting Library within Looker to organize the content and setup access control
  - o Iteratively assess the impact and design, build, test, and deploy changes to Reporting Cache and API DEX
  - o Scoped in 3 sprints for implementation, 3 weeks each, with 30 story points velocity

- **Data Use Governance**
  - o Conduct discovery for Data Use Governance information flows, requirements, & solution design
  - o Define/revise sprint scope, priority, and schedule for UI/UX design and implementation of requirements
  - o Scoped in 2 sprints for implementation, 3 weeks each, with 40 story points velocity

Assumptions:

- **General**
  - o This solution is based on existing Google Cloud Platform (GCP) - Cloud Data Fusion, Cloud Storage, Big Query, Cloud DataProc APIs, Apigee, Full

stack development suite, and Looker

- o CTRMA will procure any additional required software licenses and services per mutual agreement
- o GCP Cloud consumption cost is not included on the pricing

- **Initial Reporting Cache Data Modelling**
  - o CTRMA business teams and SME to be available for requirements discovery, and design reviews
  - o Up to 6 discovery sessions to be conducted for Report Cache Data Modelling
  - o Deloitte will work with CTRMA to finalize up to 8 data groups as part of the Initial Reporting Cache Data Modelling

- **DPS Reporting Cache API DEX**
  - o Star schema-based relational data warehouse will be developed in Big Query
  - o ETL / API DEX Pipelines to be created for up to 8 data groups identified in the Reporting Cache Data Modelling Phase
  - o Ability to turn on, turn off, or schedule DPS Reporting Cache API DEX pipelines will be provisioned through GCP Scheduler services
  - o CTRMA business teams and SME to be available for conducting UAT testing and approve deployment to Production environment after every sprint
  - o The scope for each sprint will be mutually discussed and agreed upon during backlog prioritization and sprint planning for all the 6 sprints
  - o Any new changes identified post requirements / acceptance criteria sign-off will be managed through Product Backlog and go through Prioritization during successive sprints

- **Public Reporting DEXs**
  - o CTRMA business teams and SME to be available for requirements discovery, and design reviews - up to 2 sessions to be conducted for Public Reporting DEX
  - o Deloitte will work with CTRMA to identify and build 1 data extract for public reporting purpose
  - o Same data extract can be consumed through up to 3 different channels
  - o API for daily and weekly data
  - o Google Cloud Storage Folder for Monthly and Quarterly data
  - o Third party exchange site (GitHub) for Yearly Data
  - o Ability to turn on, off, and schedule functionality for Public Reporting pipelines will be provisioned through GCP Scheduler services
  - o CTRMA business teams and SME to be available for conducting UAT testing and approve deployment to Production environment

- Reporting and Analytics Sprints
  o CTRMA will provide the prototypes for as many named reports as possible before the initiation of Sprint 0
  o The established Story Point Estimation guidelines will be followed for Sprint Planning and Backlog Prioritization
  o User stories for each sprint would be decided at the start of each sprint using Story Point Estimation guidelines
  o Up to 30 Story points will be delivered in each Sprint Cycle for 3 sprints
  o Jira software to be used to track the product backlogs, estimate user stories, planning sprint cycles & scopes, and re-prioritize stories
  o Deloitte will provide advisory design to CTRMA for any Look or Dashboard creation in Looker
  o CTRMA will take primary responsibility for the development and modification of the Looks with Deloitte's advisory support as needed
  o CTRMA will be available to conduct the UAT, provide design feedback during the sprint cycle and approval for Production deployments
  o Any new changes identified post requirements / acceptance criteria sign-off will be managed through Product Backlog and go through Prioritization during successive sprints
  o Reporting Library will be established using Looker's Shared folder to organize the Looks and Dashboards
  o Deloitte will leverage existing procedures and processes wherever applicable
  o This does not include changes to existing DPS or TOMS UI Application Screens

- Data Use Governance
  o CTRMA business teams and SME to be available for requirements discovery, and design reviews
  o Up to 2 discovery sessions to be conducted for Data Use Governance
  o Data use governance activities will leverage DPS data dictionary and attribute list
  o CTRMA business teams and SME to be available for conducting UAT testing, provide design feedback during the sprint cycle and approval for Production deployments
  o Any new changes identified post requirements / acceptance criteria sign-off will be managed through Product Backlog and go through Prioritization during successive sprints

Dependencies:
- CTRMA to provide the Report prototypes for the User stories that are to be developed in the

Reporting and Analytics Sprints

Out of Scope:
- Changes to the existing TOMS UI application functions and screens

2.3 Our Approach

As part of release 1, 2, and 3, our Deloitte team has designed and instantiated a robust, secure, and scalable architecture to support the CTRMA Data Platform System. The Google Cloud Platform (GCP) environment consists of a development, testing/UAT, and production environment. The development and testing environment are actively utilized by our cloud engineers for architectural validation and staging preparation of what is to be the future production state. The Deloitte solutions team has also incorporated best practices through our Google partnership and will continue to engage as we progress through the project. The current design is instituted based on results of collaborative discovery efforts with our CTRMA IT personnel counterparts.

In Releases 1, 2, and 3 the Deloitte solutions team adhered to a cloud first methodology enabling the CTRMA organization to fully harness the cloud capabilities. In release 4, our Deloitte team will continue to build on the established intelligence and implementations to meet the objectives required for the future production state of the DPS Reporting and Analytics solution.

In our previous Releases, the Deloitte team introduced the physical and logical architecture, and implemented the DPS solution. As illustrated below, we identified each layer constituting the GCP resources and workflow path required to communicate with CTRMA partners, exchange data, and produce various formats of outputs for consumption and further processing. The Data Sources and Data Management & Storage layers comprise of the acquisition and exchange of files process which are subsequently transformed and stored in the cloud database and persistent storage buckets. The Data consumption layer provides the application layer interface for reports, dashboards, that may be consumed by internal and external stakeholders.

Starting in Release 4, the Deloitte team will extend the DPS solution capabilities to include public, external, and internal reporting through external facing API Interfaces and Looker, as well as Data Use Governance to meet the reporting and audit control requirements.

In Release 4, the Deloitte team will engage with CTRMA to develop a Reporting Cache Data Model that would support the internal, external, and public reporting needs followed by the implementation of data flow from DPS data source to reporting cache layer in Big Query. This reporting cache layer will be the single source of truth for all reporting needs within CTRMA. As illustrated in the below diagram, existing architecture will be extended to include Public Access and Looker capabilities.
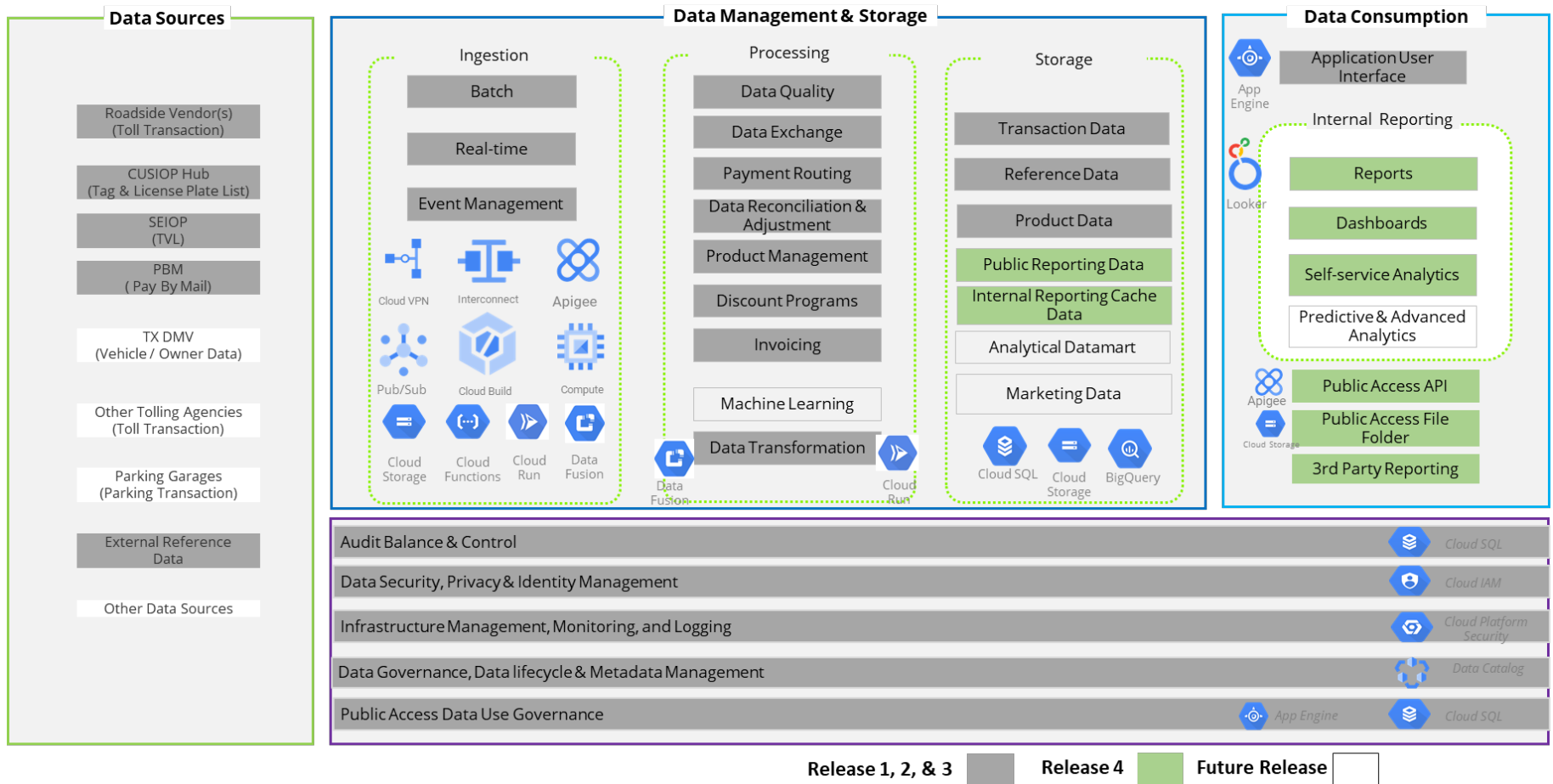
Figure 5: High Level Architecture

Our process for the development of the Reporting and Analytics solution will be broken down into five different phases following a hybrid approach with a combination of waterfall and agile which would allow us to incrementally build the reporting and analytics environment that is grounded on CTRMA stakeholders feedback received during each iteration. Following diagram illustrates the overall timeline for Release 4 Project delivery.
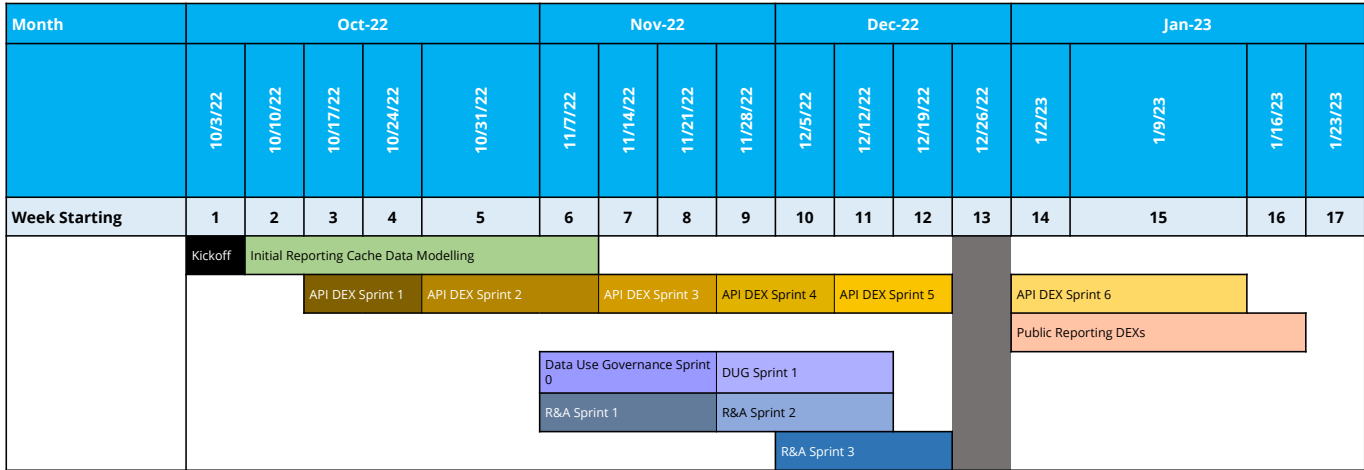
Month	Oct-22					Nov-22				Dec-22				Jan-23			
	10/3/22	10/10/22	10/17/22	10/24/22	10/31/22	11/7/22	11/14/22	11/21/22	11/28/22	12/5/22	12/12/22	12/19/22	12/26/22	1/2/23	1/9/23	1/16/23	1/23/23
Week Starting	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Figure 6: Project Timeline

Report Cache Modeling:

Starting with the Reporting Cache Data Modelling, we will work with CTRMA to identify the data groups that would be the baseline for building the Reporting Cache layer. Our Project Manager, Reporting Architect and Data Modelers will conduct series of discovery sessions to finalize the data groups. Once the data groups are finalized, we will continue to identify and define the dimensions, measures, aggregates, summaries, snapshots, and access controls for each data group along with documenting the transformation logic from DPS data source to Reporting Cache data model. The initial reporting cache will serve as a source for multi-purpose dissemination function in the design and development of -

- CTRMA public API solution to support public access,
- CTRMA authorized public file folder access.
- CTRMA authorized internal reporting and analytics solution

Steps to develop the Reporting Cache Data Model will include,

- ⇨ Developing and documenting a preliminary representation of the Reporting Cache Data Model for 8 data groups
- ⇨ Creating a logical data model that specifies the data groupings, relationships, and data definitions at a high level.
- ⇨ Defining applicable data-related business rules to build the measures and aggregates.
- ⇨ Transforming the logical data model into a physical data model specific to Big Query database leveraging the complex types available in Big Query.
  - o Data Types such as ARRAY and STRUCT will be used to de-normalize the DPS data to support faster query retrieval.

⇨ Reviewing the logical and physical models with CTRMA for approval
⇨ Creating the physical tables, database access controls, views, stored procedures, partitions, and clusters as required for the data groups.
⇨ Documenting the initial DPS API DEX ICD specifications for data extraction from operational data base which includes column-to-column mapping from source to target and data validation rules

DPS Reporting Cache API DEX:

Our development of the DPS Reporting Cache API DEX, driven by the Google Cloud platform, includes the activities related to building the reporting cache system, seamlessly extracting the data from source and transforming to the target model, integrating the various elements of the DPS system based on the identified data groups, and validating the ingested data.

At the start of each sprint within this phase, our Reporting Lead and the ETL developers will review the ICD specifications and finalize them before getting CTRMA's approval to develop the integration. We develop ingestion frameworks using Cloud Data Fusion within Google Cloud platform to extract data from DPS source tables enabling scalable data integrations. Once the data is extracted from the source system, we will use Google's data wrangler service component to handle various types of data format conversions and apply transformation rules as necessary to meet the reporting needs as specified in the ICD specifications.

Steps to develop the DPS Reporting Cache API DEX will include
⇨ Reviewing and finalizing the DPS API DEX ICD transformation specifications for data extraction from operational data base which includes column-to-column mapping from source to target for each data group
⇨ Defining the data warehouse load frequencies, dependencies, and load type (incremental/full load) for each data entity within data groups
⇨ Identifying and documenting data validation and exception handling rules
⇨ Reviewing and finalizing the load frequency and schedule
⇨ Developing the pipelines in cloud data fusion to extract and load the data from DPS in Cloud SQL Postgres to Reporting Cache layer in Big Query
⇨ Developing the transformation rules using Data Wrangler as needed based on the business transformation rules
⇨ Configuring the pipelines using the Google scheduler service to extract, load, and transform the data for each data group
⇨ Provide the documentation to administer and control the scheduler service to turn-off and turn-on as required

Public Reporting DEX:

CTRMA Reporting Analytics platform will be extended with additional capabilities to support Public Report Data Exchanges by requirement. Scope in Release 4 is confined to automate the build of one Public Reporting DEX API. Google platform services of APIGEE, GCP and Big Query will be leveraged to build the solution capability to produce qualified, approved and attested

'structured raw roadside data' file for consumption in defined public folders, internal folders, and Git-Hub folders.

Data volume based on the time window (one week time window, [Sunday through Saturday]), state of the files (compressed vs uncompressed), periodicity (daily, monthly, yearly) of the raw datafile generation will be automated per CTRMA requirement before being made available in the defined public, internal and Git-Hub folders.

Deloitte will provide documentation of the administration of DEX API file management processes, including the guidance on controls of turn-off and turn-on.

Reporting & Analytics:
Deloitte understands CTRMA's Data Platform environment, it's ongoing Release 3 efforts, and current challenges. To meet CTRMA's Reporting and Analytics requirements, Deloitte, along with CTRMA, has established an agile approach with multiple sprint cycles. Starting November 2022, over a period of 8 weeks, Deloitte will conduct a series of 3 sprint cycles to analyze CTRMA's reporting requirements and prototypes, develop, test, and deploy semantic models, review and advise CTRMA on Looks and Dashboards, configure the Reporting Library in Looker, and also enhance the Reporting Cache data model and corresponding DPS Reporting Cache API DEX pipelines.

The objective of the Sprint Cycle is to iteratively develop the reporting and analytics solution in potentially deployable increments and increase efficiency through frequent feedback. Reports are continuously designed, developed, tested, and integrated leading to increasingly complete and stable reporting solution. Deloitte team along with CTRMA's SMEs increases efficiency by identifying effective practices and adjusting to resolve what went wrong during the previous sprint cycle.
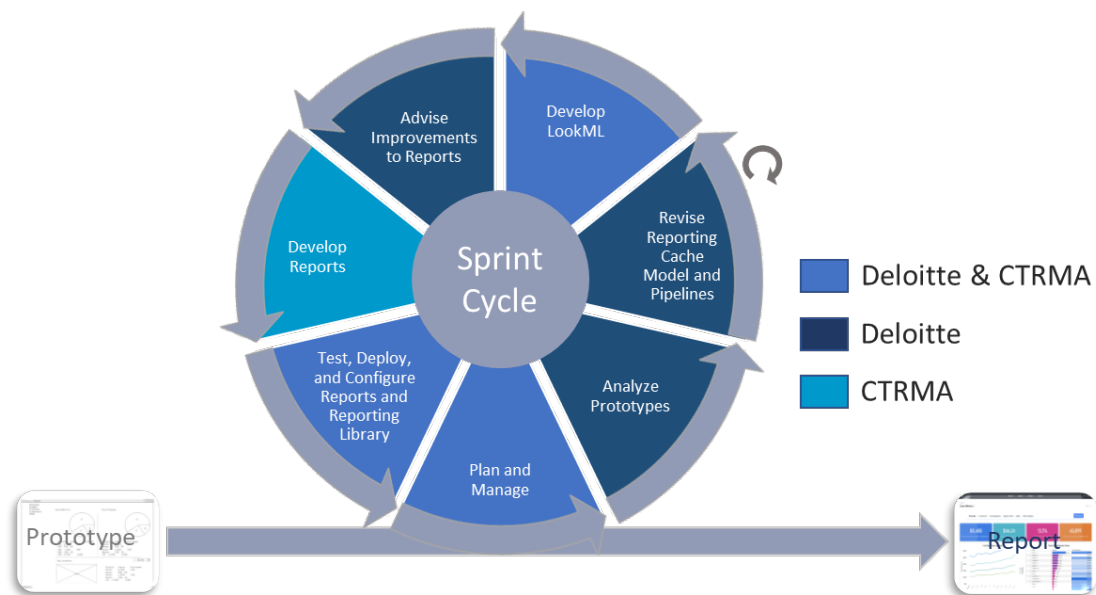

Figure 7: Reporting and Analytics Sprint Cycle

As illustrated in the Figure 7. Reporting and Analytics Sprint Cycle, our sprint cycles will follow the below process:

⇨ CTRMA documents the reporting requirements in the form of user stories before the start of each sprint. The user stories logged in Jira will include the feature requirements, report prototype, and the acceptance criteria for each Report.

⇨ At the beginning of every sprint cycle, in the plan and manage step the scrum master facilitates a sprint planning meeting with the team including the Project Manager, Looker Developers, CTRMA stakeholders and ETL Team Members to determine which user stories will be accepted into the sprint based on priority and story point sizing estimate as mentioned in the Figure 8. with 30 story points velocity.

⇨ The accepted user stories are moved from the Product Backlog into the Sprint Backlog.

⇨ The sprint planning meeting provides the team with enough information for them to forecast the work for the sprint and to start work.

Story Point Estimation for Reporting Sprints – Unit Estimates

Tasks	Unit Type	Story Points		
		Simple	Medium	Complex
Review high-level requirements documentation and prototype developed by CTRMA	Review Session (2 sessions * 2 hours)	1	1	1
Develop, test, and deploy Semantic Model in Looker which includes, Views Dimensions Measures Explores	Views using LookML	4	7	10
Review and Advise CTRMA on Looks	Looks	1	4	7
Bundle Looks into a dashboard in Looker	Dashboards	0	1	2
Configure Reporting Library within Looker to organize the contents and set up access controls for Looks, Dashboards, and Boards	Access Control and Content Management	1	1	1
Assess the impacts to Reporting Cache data model, ETL pipelines, and document the business logic to produce reports/looks in Looker	Impact Assessment and Documentation 1. Explores, 2. Report Cache Model, 3. ETL Pipelines	1	1	2
Develop/update, test, and deploy changes to Reporting Cache Data Model in Big Query	Reporting Cache Big Query Enhancements	1	2	3
Develop/update, test, and deploy Reporting ETL Pipelines	ETL Pipelines Enhancements	1	3	4
Total Story Points By Report Complexity Type		**10**	**20**	**30**

Figure 8: Story Point Estimation for Reporting Sprints

⇨ During the sprint, the scrum master facilitates the daily stand-up meeting with the team to discuss sprint progress and identify any impediments.

⇨ CTRMA stakeholders will be engaged to provide their feedback during the daily standup calls about the progress of the feature. Any changes requested will be logged and refined for future sprints based on the sizing of the requested change.

⇨ The sprint cycle includes the following steps to fully design, develop, test, and deploy the user stories for release - including any necessary documentation

  o **Analyze Prototypes**: Deloitte team will review the prototypes developed by CTRMA

and assess and document the impacts to the existing Reporting Cache Data Model, existing Pipelines and the LookML of the prototype.

- o **Revise Reporting Cache Data Model and Pipelines:** If any changes are identified to the existing Reporting Cache Data Model or the pipelines that are used for extracting, loading, and transforming the data from DPS to Reporting Cache ETL Team member will make the necessary changes to the impacted artifacts.
- o **Develop LookML**: The objective of this activity is to implement the semantic model for the data group that is required to build the Report identified in the User Story. This may include creating views, dimensions, measures, drill downs, explores, and models.
- o **Advise improvements to Reports**: Deloitte's Reporting Architect reviews the Looks and dashboards created as prototype and conduct a working session with CTRMA to provide feedbacks to make necessary changes to the Reports to adapt to the new / revised Semantic Model in Looker.
- o **Develop Reports**: CTRMA leverages the new semantic model to develop or update the Looks and Dashboards using the newly deployed explores that is built upon the reporting cache data residing in Big Query.
- o **Test, Deploy, and Configure Reports and Reporting Library**: This activity is a collection of all testing and deployment related activities with the objective to ensure that the acceptance criteria are met for the user stories implemented and includes tasks to conducting integration and user acceptance testing based on the test plan established in each sprint. CTRMA conducts the end-to-end testing of the user stories and provides approval for deployment of the Reports. Upon CTRMAs Approval Deloitte Team deploys the code to the production environment and configures the Reporting Library in Looker. This includes setting up the required access controls, creating and organizing the folder structures and deploying the dashboards within those shared folders

Data Use Governance:

Deloitte understands the CTRMA vision of the GUI based "Data Use" governance management assistance tool with a goal to protect the data use with adequate automated governing controls before releasing them for public consumption. TOMS application platform will be extended with additional capabilities to support the governance of "Data Use". Deloitte will conduct a series of 2 sprints to discover the business and functional requirements to implement Data Use Governance business process, business rules, and audit controls in the scope of Release 4.

Sprint 0 of the Data Use Governance phase will be focusing on

- ⇨ Gathering and documenting the requirements for implementing the Data Use Governance process within CTRMA as it broadens access to its data to Public and External entities
- ⇨ Modeling of the known business Data Use processes in the TOMS UI interface, and the flow of Governance
- ⇨ Designing the UI to administrate the workflow to request review, certify, and attest the data entities for reporting purposes

Sprint 1 of the phase will be focusing on the implementation aspects determining which user stories will be accepted into the sprint based on priority and story point sizing estimate as mentioned in the Figure 9. with 40 story points velocity.

Story Point Estimation for Data Use Governance Sprints – Unit Estimates

Features	Story Points		
	Simple	Medium	Complex
UI/UX Design	4	6	9
Data Capture Capability	4	5	6
Grids / Frames / Logical Fields to interact database	3	6	10
Buttons and Events for functional Navigations	2	3	5
Validations and Business Rules	0	2	5
Other Additional Features • File Upload / Bulk edit features • Download feature for Images, Videos, PDFs, or CSVs • Search Feature • Security Features • Authentication and Authorization	2	3	5
Total By UI/UX Complexity Type	**15**	**25**	**40**

Figure 9: Story Point Estimation for DUG Sprints

⇨ Building of capabilities to store the workflow driven process actions (Certified, Attested) in the DPS database to identify the allowable, qualified data elements designated for public 'Data Use'

⇨ Creation of a UI to administrate as well as facilitate sending of automated notifications/alerts to the designated persons carrying the roles of "Reviewer", "Certifier", "Attester" by CTRMA requirement,

⇨ Features to list all "Data Use" instances organized by "Entity" [Data Groups] level of granularity, and drill down to view the actions performed (modified, deleted, archived)

⇨ Features to support internal auditors to perform Data Use Governance periodically by requirement

⇨ Support user roles of 'Reviewer', 'Certifier', 'Attester' to effect workflow-based approval process before the decision is made to sign-off on release for "Data Use" for that period.

2.4 CTRMA Support

CTRMA Resources:
Our team will follow the hybrid approach for the delivery of the solution across all the phases. In each phase, we would require 20-30 hours of time during the discovery sessions of the project from Subject Matter Experts (SMEs) and other stakeholders for requirement gathering, prioritization, reviews, etc. This time requirements will reduce as the solution matures across the phases.

CTRMA Staff Roles:

Role	Responsibilities	Participation	Commitment Per Sprint
Product Owner	• Provide input for the vision of the end-product • Prioritize the build order of features scoped in each sprint	✓ Sprint Planning ✓ Backlog Grooming ✓ Daily Standup ✓ UAT ✓ Demo & Retrospective	10-15 Hours
Project Manager	• Oversee project coordination and integration between cross-functional teams	✓ Daily Standup ✓ Sprint Planning ✓ Demo and Retrospective ✓ Backlog Grooming	7 Hours
Technical Owner	• Provide direction on technical and architectural design questions	✓ Sprint Planning ✓ Demo and Retrospective ✓ UAT ✓ Backlog ✓ Grooming	5 – 7 Hours
Business / Technical Analyst	• Define business and technical requirements based on the business goals of the solution	✓ Demo and Retrospective ✓ Backlog Grooming	10-15 Hours

Sprint Cadences:

Cadence	Purpose	Length	Recurrence
Daily Standup	• Discuss daily progress, raise any impediments for remediation and update the technical Kanban chart as required	15 minutes	Daily
Sprint Planning	• Prioritize stories that are in accordance with the defined "Definition of Ready" • Accept stories for sprint inclusion based on team capacity and business priority	1 Hour	Prior to the start of each sprint
Demo and Retrospective	• Demonstrate working code • Retrospective to identify *"what worked well, what did not work well, and what could be even better…"*	1.5 Hours	Once on the last day of each sprint
UAT	• Provide UAT acceptance criteria and test scenarios • Perform user acceptance test of the sprint deliverables • Capture UAT observations and support triage to distinguish defects and enhancement change requests	10-16 Hours	Every Sprint
Backlog Grooming	• Review and discuss weekly task progress and update the technical Kanban chart as required • Add requirements to the backlog repository as user stories • Prioritize user stories for inclusion in future sprints based on business needs	1 Hour	Weekly

2.5 Deliverable Timeline

Provide estimated due dates for each deliverable specified in Section 4 [CTRMA SOW].

The scope of Release 4 activities will be broken up over multiple phases and a series of sprints within those phases and will be implemented in an agile fashion. The below table covers the overall deliverable and the estimated schedule.

Release 4 Deliverables:

Phases and Deliverables	Estimated Date
Report Cache Modeling	
Updated Reporting Requirement document	11/11/2022
Data Mapping document between Operational Database and Reporting Cache	11/11/2022
Logical Data Model for the Reporting Cache	11/11/2022
Physical Data Model for the Reporting Cache	11/11/2022
Documented schemas, ERDs, Data Entity Catalog	11/11/2022
DPS Reporting Cache API DEX	
Sprint 1	
Reporting Cache API DEX ICD	10/28/2022
Reporting Cache API DEX	10/28/2022
Reporting Cache API DEX ICD	11/11/2022
Reporting Cache API DEX	11/11/2022
Sprint 3	
Reporting Cache API DEX ICD	11/25/2022
Reporting Cache API DEX	11/25/2022
Sprint 4	
Reporting Cache API DEX ICD	12/09/2022
Reporting Cache API DEX	12/09/2022
Sprint 5	
Reporting Cache API DEX ICD	12/23/2022
Reporting Cache API DEX	12/23/2022

Phases and Deliverables	Estimated Date
Sprint 6	
Reporting Cache API DEX ICD	01/13/2023
Reporting Cache API DEX	01/13/2023
Public Reporting DEXs	
Public Reporting API DEX	01/20/2023
Public Reporting API DEX ICD	01/20/2023
Public File Folder DEX	01/20/2023
Public Reporting GitHub DEX	01/20/2023
Reporting & Analytics	
Sprint 1	
Assessment of Report Cache Model impacts and design changes	11/25/2022
Integrated Views, Dimensions, Measures, Explores, Looks, and Dashboards into production Reporting Cache model	11/25/2022
Reporting Cache Model	11/25/2022
DPS Reporting Cache API DEX	11/25/2022
Manage feature backlog for requirement/features changes identified as out-of-scope	11/25/2022
Reporting Library that includes a list of all currently available reports including navigational features for viewing available reports and returning to the Reporting Library	11/25/2022
Sprint 2	
Assessment of Report Cache Model impacts and design changes	12/16/2022
Integrated Views, Dimensions, Measures, Explores, Looks, and Dashboards into production Reporting Cache model	12/16/2022
Reporting Cache Model	12/16/2022
DPS Reporting Cache API DEX	12/16/2022
Manage feature backlog for requirement/features changes identified as out-of-scope	12/16/2022
Reporting Library that includes a list of all currently available reports including navigational features for viewing available reports and returning to the Reporting Library	12/16/2022
Sprint 3	
Assessment of Report Cache Model impacts and design changes	12/23/2022
Integrated Views, Dimensions, Measures, Explores, Looks, and Dashboards into production Reporting Cache model	12/23/2022

Phases and Deliverables	Estimated Date
Reporting Cache Model	12/23/2022
DPS Reporting Cache API DEX	12/23/2022
Manage feature backlog for requirement/features changes identified as out-of-scope	12/23/2022
Reporting Library that includes a list of all currently available reports including navigational features for viewing available reports and returning to the Reporting Library	12/23/2022
Data Use Governance	
Sprint 0	
Documented business and functional requirements	11/25/2022
Solution design and architecture	11/25/2022
Sprint 1	
UX/UI prototype	12/16/2022
UX/UI prototype demo	12/16/2022
Production-ready UX/UI features, automated workflows, and data architecture specific to Data Use Governance	12/16/2022
Feature backlog for requirement/feature changes identified as out-of-scope	12/16/2022
Revised design for requirement/feature changes identified in UAT	12/16/2022

3.0 Additional Considerations

3.1 Conflict of Interest Disclosure Statement

Please find our completed Conflict of Interest Disclosure Statement in Appendix 9.2, as stated in Appendix C of the Data Platform Services Statement of Work.

4.0 Trust Services Criteria

Deloitte's SOC experience and expertise include our significant involvement in the development of SOC with the AICPA. Deloitte is a leader in training and deploying SOC professionals and has performed SOC examinations for hundreds of clients worldwide. Our approach includes a national SOC advisory committee that is responsible for:

- Training more than 2,000+ professionals, domestically and internationally, on SOC report execution and AICPA and international guidance.
- Providing quality assurance internally to confirm that Deloitte issues SOC reports following AICPA and international guidance.
- Identifying and disseminating trends and issues related to SOC to keep our professionals informed and aware of ongoing changes in the business environment.

Deloitte performs nearly 700+ SOC engagements in the United States annually which includes SOC 2 reports (both Type I and Type II and readiness) since the new AICPA standards on SOC 2 and the Trust Principles were released. Our professionals have covered subject matter across the AICPA Trust Principal areas. Deloitte has experience in advising on design, documentation and review of policies, procedures and controls that address the following Trust Service Criteria:

- Security
- Availability
- Confidentiality
- Processing Integrity and
- Privacy

Our national leaders are also readily available to advise this team on SOC related and industry related subject matters. We believe Deloitte is well-positioned to provide you with a focused client service team and service approach that aligns with our SOC experience.

SOC Differentiators
A differentiator in the delivery of SOC services is our tools. Below is a summary of the tools and accelerators available in the delivery of our services. We are more than happy to discuss further or provide a tools demonstration upon request.

Select Deloitte Tools & Accelerators
Deloitte BOLT - SOC Documentation and Reporting Platform – We have invested in technology and tools that will enable our SOC professionals to be become more efficient by facilitating integrated updates to testing procedures, underlying workpapers and the overall

Select Deloitte Tools & Accelerators

SOC report in one central tool. The SOC tool is a powerful, database-driven audit technology platform, which provides real-time progress and status updates, and it automatically reports on audit results and findings.

Deloitte Connect – A web-based application that improves communication and project management by serving as a "single view" that utilizes dashboards that provide real-time tracking of information requests, and online logs that provide transparency into issues and findings and can facilitate timely resolution. Serves as a repository for files, sends automated reminders of due dates, and allows the team to easily analyze deliverables and outstanding items.

Third Party Central – SOC guidance and resource repository, which is a one stop shop which drives consistency across Deloitte SOC engagements through standardized tools, templates, report formats and other SOC resources.

Automated Control Testing Tool (ACTT) – ACTT is a Deloitte proprietary tool providing efficiency through automated data extraction and testing in areas such as Segregation of Duties (SOD) analysis and general IT controls testing for commonly used operating systems, database software, and large ERPs (SAP, PeopleSoft, Oracle, etc.)

5.0 Financial Ability to Implement Project

5.1 Deloitte

Deloitte LLP and its subsidiaries (the "U.S. Firms") provide audit, advisory, tax, and consulting services through approximately 121,000 people in 97 cities. For the most recent fiscal year ended May 30, 2021, the U.S. Firms had revenue of U.S. $22 billion. See more detailed information in the chart below.

Since the U.S. Firms are privately owned partnerships, they do not have audited financial statements, nor do they file other corporate financial information such as a 10-K. Should you have additional questions regarding the financial information, please contact Janet Lewell, Chief Financial Officer of Deloitte LLP, at (212) 436-5655 or Anissa Nelson-Carlisle, Chief Accounting Officer of Deloitte LLP, at (615) 259-1823.

Further, although the U.S. Firms do not have a rating from one of the nationally recognized credit rating agencies, their privately placed debt is assigned a designation by the National Association of Insurance Commissioners ("NAIC"). The U.S. Firms' privately placed debt carries an NAIC 1 designation; NAIC's highest designation, which is comparable to an A or better rating from one of the nationally recognized rating agencies.

Detailed information regarding Deloitte LLP in the U.S. is provided in the chart below.

In the US	2021	2020	2019
Revenues ($ in millions)	$22,931	$23,157	$21,913
Revenue mix by business	**2021**	**2020**	**2019**
Audit and Enterprise Risk Services	28.0%	27.2%	27.0%
Consulting	52.5%	52.2%	52.7%
Financial Advisory Services	3.4%	3.4%	3.6%
Tax	16.1%	17.2%	16.7%
Revenue growth by business	**2021**	**2020**	**2019**
Audit and Enterprise Risk Services	1.9%	6.1%	3.7%
Consulting	(0.5%)	4.4%	14.0%
Financial Advisory Services	(1.2%)	(0.6%)	2.6%
Tax	(6.8%)	8.5%	7.7%
Professional headcount	**2021**	**2020**	**2019**
Partners, principals, and managing directors	5,665	5,932	5,811
Staff	98,368	89,342	84,718
Professionals (partners, principals, and managing directors + staff)	104,033	95,274	90,529
Administrative	17,660	17,983	16,389
Total	**121,693**	**113,257**	**106,918**
Other	**2021**	**2020**	**2019**
Offices (national and regional)	126	126	130
Number of cities	97	102	105

This financial information was prepared for internal purposes. This financial information has not been audited and does not present the financial position, results of operations, or other financial information in accordance with generally accepted accounting principles.

The use of this information is restricted to your consideration in providing you professional services. Any other use or circulation of this information is prohibited.

6.0   Pricing

Deloitte understands that CTRMA is looking for a long-term partner to support its Reporting & Analytics Management domain and deliver an innovative technical solution in line with its broader vision. Furthermore, the success of the initiative and supporting projects will be based largely on the strength of the team. As such, Deloitte has not only proposed a set of key resources who exceed the agency's expectations, but we have also provided a supporting rate card that is competitive in the market and aligned with existing rates currently in use with the State of Texas. We believe that these rates are competitive and support the retention and future on- boarding of top tier talent.

We understand that CTRMA will negotiate contract terms following vendor selection. Our proposal is submitted subject to and governed by the DBITS terms and conditions as set forth in DBITS # DIR-CPO-4919.

Our approach assumes that CTRMA will purchase any additional required software, hardware, and hosting in support of the agreed upon scope of work. All Google Cloud Platform services are available on Texas DIR contract # DIR-TSO-4162, via Google Cloud's exclusive government distributor, Carahsoft Technology Corporation.

We have attached our detailed pricing for Release 4 phases, sprint cycles, and estimated week ending due along with the pricing information, based on the project start date of 10/03/2022.

Deliverable	Deliverable Type	Estimated Date	Payment Amount
Report Cache Modeling	Document and Data Model	11/11/2022	$88,324
DPS Reporting Cache API DEX – Sprint 1	Document and DEX Artifacts	10/28/2022	$45,000
DPS Reporting Cache API DEX – Sprint 2	Document and DEX Artifacts	11/11/2022	$45,000
DPS Reporting Cache API DEX – Sprint 3	Document and DEX Artifacts	11/25/2022	$45,000
DPS Reporting Cache API DEX – Sprint 4	Document and DEX Artifacts	12/09/2022	$45,000
DPS Reporting Cache API DEX – Sprint 5	Document and DEX Artifacts	12/23/2022	$45,000
DPS Reporting Cache API DEX – Sprint 6	Document and DEX Artifacts	01/13/2023	$45,000
Public Reporting DEXs	Document and DEX Artifacts	01/20/2023	$50,032
Reporting & Analytics – Sprint 1	Impact Analysis and Reports	11/25/2022	$67,671
Reporting & Analytics – Sprint 2	Impact Analysis and Reports	12/16/2022	$67,671
Reporting & Analytics – Sprint 3	Impact Analysis and Reports	12/23/2022	$67,671
Data Use Governance - Sprint 1	Document and TOMS Artifacts	11/25/2022	$70,156
Data Use Governance - Sprint 2	Document and TOMS Artifacts	12/16/2022	$70,156
Total			**$751,681**

7.0 Thank you

Thank you for the opportunity to respond to the Central Texas Regional Mobility Authority (CMTRA) Statement of Work (SOW) for Release 4 Reporting and Analytics solution in support of the agency's future toll transaction processing platform. We are excited to continue to work with CTRMA, deploying a team of experts from across our firm to build upon the work we have already done with you. We are well positioned to support CTRMA's commitment to delivering innovative multi modal solutions powered by cutting edge technology.

8.0　Appendix

8.1 Conflict of Interest Disclosure Statement

Please see below our completed Conflict of Interest Disclosure Statement as stated in Appendix C of the Data Platform Services Statement of Work.

This Disclosure Statement outlines potential conflicts of interest as a result of a previous or current business relationship between the undersigned individual (and/or the firm for which the individual works) and an individual or firm submitting a Statement of Qualifications or otherwise under consideration for a contract associated with Central Texas Regional Mobility Authority. Section I of this Disclosure Statement Form describes the potential conflicts of interest. Section II of this Disclosure Statement Form describes the TSI's management plan for dealing with the potential conflicts of interest as described in Section I of this form. This Disclosure Statement is being submitted in compliance with the Central Texas Regional Mobility Authority's Conflict of Interest Policy for Consultants. The undersigned acknowledges that approval of the proposed management plan is within the sole discretion of the Central Texas Regional Mobility Authority.

SECTION I. Description of Potential Conflicts of Interest.

To the best of my knowledge, Deloitte Consulting has no known or perceived conflict of interest in performing the work under this RFP.

SECTION II. Management Plan for Dealing with Potential Conflicts of Interest.

We will promptly notify CTRMA of any conflicts that arise and consult with you to find a workable resolution

SIGNED:_____DATE:_____09/12/2022_____
NAME AND TITLE:___*Uday Katira, Managing Director*_____
REPRESENTING:_____*Deloitte Consulting LLP*_____

APPROVED BY THE CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY:
SIGNED:_____DATE: _____
NAME AND TITLE: _____

DIR Vendor Agreement

This is to signify that the Central Texas Regional Mobility Authority and Deloitte Consulting LLP Corporation have entered into an Agreement **in an amount not to exceed $796,782** pursuant to Texas Government Code Section 2054.0565 utilizing Texas Department of Information Resources Contract No. #DIR-CPO-4919 for the deliverable-based information technology services described in this proposal. All terms and conditions of Texas Department of Information Resources Contract No. #DIR-CPO-4919 are applicable to and made part of this agreement.

DELOITTE CONSULTING LLP

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

_____   _____

Uday Katira, Managing Director   James Bass
Deloitte Consulting LLP   Executive Director

09/22/2022
_____   _____

Date   Date

Public Records Act Agreement

Contractor acknowledges and agrees that all records, documents, drawings, plans, specifications and other materials in the Authority's possession, including materials submitted by Contractor, are subject to the provisions of the Texas Public Information Act (see Texas Government Code § 552.001). Contractor shall be solely responsible for all determinations made by it under such law, and for clearly and prominently marking each and every page or sheet of materials with "Trade Secret" or "Confidential", as it determines to be appropriate. Contractor is advised to contact legal counsel concerning such law and its application to Contractor.

If any of the materials submitted by the Contractor to the Authority are clearly and prominently labeled "Trade Secret" or "Confidential" by Contractor, the Authority will endeavor to advise Contractor of any request for the disclosure of such materials prior to making any such disclosure. Under no circumstances, however, will the Authority be responsible or liable to Contractor or any other person for the disclosure of any such labeled materials, whether the disclosure is required by law, or court order, or occurs through inadvertence, mistake or negligence on the part of the Authority or its officers, employees, contractors or consultants.

In the event of litigation concerning the disclosure of any material marked by Contractor as "Trade Secret" or "Confidential," the Authority's sole obligation will be as a stakeholder retaining the material until otherwise ordered by a court, and Contractor shall be fully responsible for otherwise prosecuting or defending any action concerning the materials at its sole cost and risk; provided, however, that the Authority reserves the right, in its sole discretion, to intervene or participate in the litigation in such manner as it deems necessary or desirable. All costs and fees, including reasonable attorneys' fees and costs, incurred by the Authority in connection with any litigation, proceeding or request for disclosure shall be reimbursed and paid by Contractor.

DELOITTE CONSULTING LLP   **CENTRAL TEXAS REGIONAL**
                                               MOBILITY AUTHORITY

_____   _____
Uday Katira, Managing Director   James Bass
Deloitte Consulting LLP   Executive Director

9/22/2022
_____   _____
Date   Date

Exhibit B

Agenda

- Release 4 High Level Scope

- Delivery Approach, Timeline & Sprint Plan

- Story Point Estimation – Unit Estimates

- Deliverable Schedule & Pricing

- Assumptions

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High Level Scope

#	Functionality/Module	Details
1	Reporting Cache Modeling	▪ Discover and document future state reporting schemas, entities & relationships (ERDs), and data entity catalog ▪ Design, model, test, and deploy initial Reporting Cache model(s) ▪ **Scoped in 8 data groups for modeling: Roadside, DEX, Transaction, Product, Pricing, Discounts, Billing, Financial** ▪ **Iterative modeling required for Reports would be handled as part of reporting sprints, with as much modeling upfront as possible in the initial phase**
2	DPS Reporting Cache API DEX	▪ Identify and map required DPS OLTP data entities and attributes to Reporting Cache ▪ Document, Design, build, test, and deployment of initial DPS Reporting Cache API DEX ▪ **Iterative design, build, test and deployment of DPS Reporting Cache API DEX would be handled as part of reporting sprints**
3	Public Reporting DEXs	▪ Identify the use case for the Public Reporting API DEX **for a single channel / single dataset** ▪ Design, build, test and deployment of the Public Reporting API DEX API ▪ Identify the use case for **larger collection of the same dataset** to be provisioned through Public File Folder DEX ▪ Design, build, test, and deploy Public File Folder DEX as well as file management schedule ▪ Identify the use case for **even larger collection of the same dataset** to be provisioned through Public Reporting GitHub DEX ▪ Design, build, test, and deploy Public Reporting GitHub DEX and file management schedule
4	Reporting & Analytics	▪ Review and understand report prototypes and related requirements documents ▪ Develop, test, and deploy Semantic Model including Views, Dimensions, Measures and Explores ▪ Review and Advise CTRMA on Looks and Bundling of Looks on a Dashboard ▪ Configure Reporting Library within Looker to organize the content and setup access control ▪ Iteratively assess the impact and design, build, test and deploy changes to Reporting Cache and API DEX ▪ **Scoped in 3 sprints for implementation, 3 weeks each, with 30 story points velocity**
5	Data Use Governance	▪ Conduct discovery for Data Use Governance information flows, requirements, & solution design ▪ Define/revise sprint scope, priority, and schedule for UI/UX design and implementation of requirements ▪ **Scoped in 2 sprints for implementation, 3 weeks each, with 40 story points velocity**

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Delivery Approach, Timeline and Sprint Plan

- Release 4 will be leveraging Hybrid Approach with a combination of waterfall, iterative and agile delivery schedule
- Reporting Cache Data Modeling and Public Reporting DEXs will be delivered in a waterfall manner with defined deliverable-based milestones
- Reporting Cache API DEX is recommended to be delivered through agile sprints (2 weeks each) given the volume of anticipated data pipelines and optimal delivery time required. This will allow reporting work to start without waiting for API DEX delivery to be complete **(change in approach)**
- API DEX sprints will prioritize and sequence data pipeline design, build, test and deploy for data groups in the order of priority for reporting sprints
- Reports and Data Use Governance will be delivered through agile sprints (3 weeks each) once discovery is completed and will be sized for 30 story points velocity

Month		Oct-22					Nov-22				Dec-22				Jan-23		
		10/3/22	10/10/22	10/17/22	10/24/22	10/31/22	11/7/22	11/14/22	11/21/22	11/28/22	12/5/22	12/12/22	12/19/22	12/26/22	1/2/23	1/9/23	1/16/23	1/23/23
Week Starting		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Gantt chart bars:
- Kickoff (Week 1)
- Initial Reporting Cache Data Modelling (Weeks 2–6)
- API DEX Sprint 1 (Weeks 3–4)
- API DEX Sprint 2 (Weeks 5–6)
- API DEX Sprint 3 (Weeks 7–8)
- API DEX Sprint 4 (Week 9)
- API DEX Sprint 5 (Weeks 10–11)
- API DEX Sprint 6 (Weeks 14–15)
- Public Reporting DEXs (Weeks 14–16)
- Data Use Governance Sprint 1 (Weeks 6–7)
- DUG Sprint 2 (Weeks 8–10)
- R&A Sprint 1 (Weeks 6–7)
- R&A Sprint 2 (Weeks 8–10)
- R&A Sprint 3 (Weeks 10–12)

Story Point Estimation for Reporting Sprints – Unit Estimates

Tasks	Unit Type	Story Points		
		Simple	Medium	Complex
Review high-level requirements documentation and prototype developed by CTRMA	Review Session (2 sessions * 2 hours)	1	1	1
Develop, test, and deploy Semantic Model in Looker which includes, Views Dimensions Measures Explores	Views using LookML	4	7	10
Review and Advise CTRMA on Looks	Looks	1	4	7
Bundle Looks into a dashboard in Looker	Dashboards	0	1	2
Configure Reporting Library within Looker to organize the contents and set up access controls for Looks, Dashboards, and Boards	Access Control and Content Management	1	1	1
Assess the impacts to Reporting Cache data model, ETL pipelines, and document the business logic to produce reports/looks in Looker	Impact Assessment and Documentation 1. Explores, 2. Report Cache Model, 3. ETL Pipelines	1	1	2
Develop/update, test, and deploy changes to Reporting Cache Data Model in Big Query	Reporting Cache Big Query Enhancements	1	2	3
Develop/update, test, and deploy Reporting ETL Pipelines	ETL Pipelines Enhancements	1	3	4
Total Story Points By Report Complexity Type		**10**	**20**	**30**

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Story Point Estimation for Data Use Governance Sprints – Unit Estimates

Features	Story Points		
	Simple	**Medium**	**Complex**
UI/UX Design	4	6	9
Data Capture Capability	4	5	6
Grids / Frames / Logical Fields to interact database	3	6	10
Buttons and Events for functional Navigations	2	3	5
Validations and Business Rules	0	2	5
Other Additional Features • File Upload / Bulk edit features • Download feature for Images, Videos, PDFs, or CSVs • Search Feature • Security Features • Authentication and Authorization	2	3	5
Total By UI/UX Complexity Type	**15**	**25**	**40**

Deliverable Schedule and Pricing

Proposed Release 4 deliverable/payment schedule information

Deliverable	Deliverable Type	Estimated Week Ending	Cost Per Phase / Sprint	No. of Sprints	Total Payment Amount
Reporting Cache Model	Document and Data Models	6	$88,324	1	$88,324
DPS Reporting Cache API DEX	Document and DEX Artifacts	4, 6, 8, 10, 12, 15	$45,000	6	$270,000
Public Reporting DEXs	Document and DEX Artifacts	16	$50,032	1	$50,032
Reporting & Analytics	Impact Analysis and Reports	8, 11, 12	$67,671	3	$203,013
Data Use Governance	Document and TOMS Artifacts	8, 11	$70,156	2	$140,312
Total					**$751,681**

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Assumptions

General
- This solution is based on existing Google Cloud Platform (GCP) - Cloud Data Fusion, Cloud Storage, Big Query, Cloud DataProc APIs, Apigee, Full stack development suite, and Looker
- CTRMA will procure any additional required software licenses and services per mutual agreement
- GCP Cloud consumption cost is not included on the pricing

Initial Reporting Cache Data Modelling
- CTRMA business teams and SME to be available for requirements discovery, and design reviews
  - Up to 6 discovery sessions to be conducted for Report Cache Data Modelling
- Deloitte will work with CTRMA to finalize up to 8 data groups as part of the Initial Reporting Cache Data Modelling

DPS Reporting Cache API DEX
- Star schema-based relational data warehouse will be developed in Big Query
  - ETL / API DEX Pipelines to be created for up to 8 data groups identified in the Reporting Cache Data Modelling Phase
- Ability to turn on, turn off, or schedule DPS Reporting Cache API DEX pipelines will be provisioned through GCP Scheduler services
- CTRMA business teams and SME to be available for conducting UAT testing and approve deployment to Production environment after every sprint
- The scope for each sprint will be mutually discussed and agreed upon during backlog prioritization and sprint planning for all the 6 sprints
- Any new changes identified post requirements / acceptance criteria sign-off will be managed through Product Backlog and go through Prioritization during successive sprints

Public Reporting DEXs
- CTRMA business teams and SME to be available for requirements discovery, and design reviews - up to 2 sessions to be conducted for Public Reporting DEX
- Deloitte will work with CTRMA to identify and build 1 data extract for public reporting purpose
  - Same data extract can be consumed through up to 3 different channels
    - API for daily and weekly data
    - Google Cloud Storage Folder for Monthly and Quarterly data
    - Third party exchange site (GitHub) for Yearly Data
- Ability to turn on, off, and schedule functionality for Public Reporting pipelines will be provisioned through GCP Scheduler services
- CTRMA business teams and SME to be available for conducting UAT testing and approve deployment to Production environment

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Assumptions

Reporting and Analytics Sprints

- CTRMA will provide the prototypes for as many named reports as possible before the initiation of Sprint 0
- The established Story Point Estimation guidelines will be followed for Sprint Planning and Backlog Prioritization
- User stories for each sprint would be decided at the start of each sprint using Story Point Estimation guidelines
- Up to 30 Story points will be delivered in each Sprint Cycle for 3 sprints
- Jira software to be used to track the product backlogs, estimate user stories, planning sprint cycles & scopes, and re-prioritize stories
- Deloitte will provide advisory design to CTRMA for any Look or Dashboard creation in Looker
- CTRMA will take primary responsibility for the development and modification of the Looks with Deloitte's advisory support as needed
- CTRMA will be available to conduct the UAT, provide design feedback during the sprint cycle and approval for Production deployments
- Any new changes identified post requirements / acceptance criteria sign-off will be managed through Product Backlog and go through Prioritization during successive sprints
- Reporting Library will be established using Looker's Shared folder to organize the Looks and Dashboards
- Deloitte will leverage existing procedures and processes wherever applicable
- This does not include changes to existing DPS or TOMS UI Application Screens

Data Use Governance

- CTRMA business teams and SME to be available for requirements discovery, and design reviews
    - Up to 2 discovery sessions to be conducted for Data Governance
- Data use governance activities will leverage DPS data dictionary and attribute list
- CTRMA business teams and SME to be available for conducting UAT testing, provide design feedback during the sprint cycle and approval for Production deployments
- Any new changes identified post requirements / acceptance criteria sign-off will be managed through Product Backlog and go through Prioritization during successive sprints

Appendix

Story Point Estimation for Sprints – Reporting Complexity Definition

Features / Complexity	Simple	Medium	Complex
No. of Views	1-2	3-6	>7
Data selection / logic	Minimal data retrieval from tables/ views, Standard SQL statements	Data retrieval from multiple tables, views, Contains Dynamic SQL statements/aggregate awareness	Significant data retrieval from large number of tables/ views / derived tables, Contains complex Dynamic SQL statements/aggregate awareness, consideration for performance
No. of dimensions available in the Views	<10	10-20	>20
No. of custom aggregates / formulae defined in the Views	<3	3-6	6-10
No. of liquid variables to create dynamic content	none	<5	5+
No. of dashboard filters / prompts	<3	3-6	6-10
Looks/Charts	<3	<7	7+
Optional Drill Downs / Drill Throughs	1 common drill down, 0 drill-throughs	2 - 4 drill downs within a report, 0 drill-throughs	4+ drill downs within a report, or Additional drill through reports
Other Optional Features	▪ Modify Looks (KPIs and Charts) ▪ Object Level Security	▪ Modify Looks (KPIs and Charts) ▪ Object Level Security ▪ Configure Dashboard Level Filters ▪ Create Derived Columns and Measures	▪ Modify Looks (KPIs and Charts) ▪ Object Level Security ▪ Configure Dashboard Level Filters ▪ Create Derived Columns and Measures ▪ Row Level Security ▪ Configure Custom Themes and Palettes ▪ Configure Visual Level and Multi Page Filters ▪ Create Dashboards and Tiles

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Story Point Estimation for Sprints – API DEX Complexity Definition

Features \ Complexity	Simple	Medium	Complex
No. of Sources	Extract from 1-2 source flat files/tables	Extract from 3-4 source flat files/tables	Extract from 5+ source flat files/tables
No. of transformation nodes	1	2-5	6+
Target instances	1	1-3	3+
No. of fields to be transformed	1-5	5-10	10-20
No. of Pipelines	1-2	3-4	4-8
Post Processes (if any)	0	1-2	3-5
Procedures (if any)	0	1-3	>3

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Story Point Estimation for Sprints – UI/UX Complexity Definition

Features \ Complexity	Simple	Medium	Complex
UI / UX Design	Display of static information	Display of information interacting with database	Display of information interacting with database and implementing complex business rules
Data Capture Capability	Information-Only	Data Capture Capability (Create/Edit) with up to 5 complex business rules	Data Capture Capability (Create/Edit) with up to 8 complex business rules
Grids / Frames / Logical Fields to interact database	Up to 5 logical fields mostly with static data, Or Static Links	Up to 10 Logical Fields, 1 simple Grid / Frame	10 or More Logical Fields, 3 simple Grid / Frame
Buttons and Events for functional navigations	Up to 2 buttons to navigate across screens	Up to 4 user events/clickable buttons to manipulate the data	4 or more user events/clickable buttons to manipulate the data
Validations	None	Validation for 10 or less fields	Validation for 10 or more fields
Searches	None	Up to 5 filters	Up to 10 Filters
Other Additional Features	- Display data in grids/frames - Include static links - Login implementation with Single Sign-on - Multi-role-based access control implementation	- Display data in grids/frames - Include dynamic links - Implement business rules while displaying / capturing data on screen - Data sourced from more than 3 tables and requires edit/deletes - Login implementation with Single Sign-on - Multi-role-based access control implementation	- Display data in grids/frames - Include dynamic links - Implement business rules while displaying / capturing data on screen - Data sourced from more than 3 tables and requires edit/deletes - Including pagination features in search result screens - File Upload/ Bulk edit features / Custom group dropdown features - Download feature for Images, Videos, PDFs, or CSVs - Login implementation with Single Sign-on - Multi-role-based access control implementation

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