

STATE OF CALIFORNIA
Budget Change Proposal - Cover Sheet
 DF-46 (REV 07/23)

Fiscal Year 2024-25	Business Unit Number 2660	Department Transportation
Hyperion Budget Request Name 2660-083-BCP-2024-GB		Relevant Program or Subprogram 9900100 - Administration

Budget Request Title
Enterprise Data Storage Expansion

Budget Request Summary

The California Department of Transportation requests \$12,873,000 in FY 2024-25 and \$10,195,000 in FY 2025-26 and ongoing to continue expansion of data storage, protect and maintain equipment and complete network infrastructure upgrades to enable efficient access to very large data sets at designated locations throughout the state.

Requires Legislation (submit required legislation with the BCP) <input type="checkbox"/> Trailer Bill Language <input type="checkbox"/> Budget Bill Language <input checked="" type="checkbox"/> N/A	Code Section(s) to be Added/Amended/Repealed Click or tap here to enter text.	
Does this BCP contain information technology (IT) components? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>If yes, departmental Chief Information Officer must sign.</i>	Department CIO Marcie Kahbody (Acting)	Date Click or tap to enter a date.

For IT requests, specify the project number, the most recent project approval document (FSR, SPR, S1BA, S2AA, S3SD, S4PRA), the approval date, and the total project cost.

Project No. Click or tap here to enter text. **Project Approval Document:** Click or tap here to enter text.

Approval Date: Click or tap to enter a date. **Total Project Cost:** Click or tap here to enter text.

If proposal affects another department, does other department concur with proposal? Yes No
Attach comments of affected department, signed and dated by the department director or designee.

Prepared By MARCIE KAHBODY	Date Click or tap to enter a date.	Reviewed By KEITH DUNCAN	Date Click or tap to enter a date.
Department Director TONY TAVARES	Date Click or tap to enter a date.	Agency Secretary TOKS OMISHAKIN	Date Click or tap to enter a date.

Department of Finance Use Only

Additional Review: Capital Outlay ITCU FSCU OSAE Dept. of Technology

Principal Program Budget Analyst James Moore	Date submitted to the Legislature 1/12/2024
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A. Problem Statement

The California Department of Transportation (Caltrans) requests \$12,873,000 in fiscal year (FY) 2024-25 to address additional data storage and protection needs and completion of network infrastructure upgrades at designated location throughout the state. In addition, \$10,195,000 in permanent funding is requested beginning in FY 2025-26 for equipment maintenance and to address the growing need for data storage, protection, and archival services to support increased data storage requirements due to increased funding of transportation projects.

In FY 2022-23, BCP 2660-093-BCP-2022-GB, Enterprise Data Storage was approved. The request included six (6) permanent positions to support the data storage expansion; two (2) fiscal years of one-time funding for data storage expansion; enhancements to network infrastructure to improve data access response time for work groups utilizing very large data sets; and conversion of fragile film-based historical right-of-way documents to digital records with geocoding for quick reference. These efforts are on track to be completed on time and within budget. See Appendix 1 for funding in the approved BCP.

Data gathered from Caltrans programs (to assess near term and expected future growth through two surveys conducted over the last three years by the Geospatial Data Officer) supported the data storage funding approved and the funding requested in this BCP. See Appendix 2 for a summary of the data collected in the surveys.

This new request is a follow-on to the FY 2022-23 BCP that addresses funding for a third year of data storage expansion and upgrades to network infrastructure at designated locations throughout the state. In addition, permanent funding is requested for data expansion growth and vendor maintenance support for the network and data storage equipment beginning in FY 2025-26.

Senate Bill 1 (SB 1), The Road Repair and Accountability Act of 2017, greatly increased the amount of transportation project delivery funding and has driven the need for additional data storage capacity for the numerous Caltrans programs involved in all aspects of the transportation project delivery lifecycle. Concurrently with the increased project delivery workload, Caltrans has increased emphasis on transition from a paper-based process by automating all aspects of the project delivery and asset maintenance programs including administrative documentation and engineering related data. In addition to the ongoing funding from SB 1, the Federal Infrastructure and Jobs Act (IIJA), 11/2021, will provide California with an additional \$41.9 billion of guaranteed funding for transportation projects over the next five (5) federal fiscal years. This influx of additional federal funding will increase the number of concurrent transportation projects which will in turn drive the need for additional data storage space.

Another new driver of the need for additional data storage space is the recently passed California Assembly Bill 1037 (AB 1037), 09/22, which requires Caltrans to develop a plan to deliver projects from inception to maintenance using more digital tools and to make progress in implementing tools for project delivery efficiency. This effort coincides with the IIJA Act funding of \$100 million for states' adoption of digital tools to promote efficiency in the transportation project delivery processes.

In summary, Caltrans' transportation project delivery workload has been increasing due to the influx of additional state and federal funding increases and the use of new generations of digital data collection tools in all phases of project delivery have led to an ongoing need for additional one-time and ongoing funding for primary, secondary, and archival data storage capacity. These new data collection tools include aerial survey data collection through photogrammetry, light detection and ranging (LiDAR), drones with high resolution cameras, Mobile Terrestrial Laser Scanners (MTLS) vehicles for survey data, bathymetry for underwater surveys, building information modeling for civil and architectural structures, geologic and geophysics modeling, hydraulics models, geospatial information system (GIS) and image

collection tools for environmental impact analysis and reporting, and real-time kinematic (RTK) rover equipment during construction. In addition to the volume of projects, project delivery processes are becoming increasingly data-driven and more complex in the outcomes it aims to achieve with delivered projects. There is an increasing need for data to feed into efforts such as activity-based travel demand modeling and analysis, near real time maintenance and operations decision making informed by streaming data from connected devices, and innovative and sophisticated machine learning and artificial intelligence powered analysis tools for planning and operations.

Information Technology Resource History
(Dollars in thousands)

Program Budget	2018-19	2019-20	2020-21	2021-22	2022-23
Authorized Expenditures	\$127,285	\$114,390	\$112,153	\$135,595	\$162,760
Actual Expenditures	\$123,433	\$114,454	\$110,818	\$136,341	\$168,330
Authorized Positions	556.0	556.0	556.0	561.0	596.0
Filled Positions	519.5	521.9	517.0	548.3	541.0
Vacancies	36.5	34.1	39.0	12.7	55.0

B. Justification

Major factors that continue to drive increasing demands for data file storage at Caltrans include:

1. The passage of SB 1 in 2017, which increased the funding of transportation projects throughout the state. This has increased the number of projects in the project delivery lifecycle and thus has increased the collection and use of large data files by the following Divisions:
 - a. Division of Right of Way and Land Surveys
 - b. Division of Design
 - c. Division of Construction
 - d. Division of Maintenance
 - e. Division of Traffic Operations

The Division of Maintenance and Division of Traffic Operations are ultimately responsible for the maintenance and operations of the state highway systems, including bridges, drainage, pavement, and traffic management systems. For example:

- Since the passage of SB 1, Caltrans has fixed an average of 227 bridges annually –a 99 percent increase over pre-SB 1 funding.
- Since the passage of SB 1, Caltrans has fixed an average of 187,500 linear feet of culverts annually –a 701 percent increase over pre-SB 1 funding.
- Since the passage of SB 1, Caltrans has fixed an average of 2,580 lanes miles annually – an 80 percent increase over pre-SB 1 funding.

2. In the FY 2021-22 May Budget Revision, the Governor included \$11 billion in additional funding for transportation projects and the addition of 548 Full Time Equivalents for the Capital Outlay Support Program project delivery workload.
3. Increased workloads funded through the IJA (11/21) which provides Caltrans with formula-based funding (guaranteed) of \$41.9 billion over 5 federal fiscal years (FFY) to address improvements in California transportation programs. Note: California has already received \$4.02 billion in FFY 2021 and \$5.49 billion in FFY 2022. It is projected that California will receive \$5.61 billion in FFY 2023, \$5.71 billion in FFY 2024, \$5.81 billion in FFY 2025 and \$5.91 billion in FFY 2026. This new funding source will increase the need for digital data storage for very large data sets generated by increased use of the latest generation of data collection tools throughout the project delivery to maintenance lifecycle. In addition, the IJA act includes \$100 million targeted at increasing the efficiency of project delivery by funding the expanded use of new digital tools to automate all aspects of the project delivery process and retention of administrative (e.g., contract documents) and engineering documentation for ease of reporting and asset maintenance processes.
4. Caltrans' migration to a paperless project delivery lifecycle drives the increased use of digital data collection technologies that collect a variety of data used in the design, construction, maintenance, and inspection processes without exposing Caltrans staff to safety hazards involved with working within or near the travel way or on unstable slopes or in post-fire areas. In addition to digitizing contracts and other "administrative" documents associated with the project delivery process investments continue in additional digital collection tools such as LiDAR, Unmanned Aerial Systems, Terrestrial LiDAR and RTK rover equipment used during construction. The expanded use of this equipment drives the need for additional data storage space.
5. The passage of AB1037 (2021-2022), Infrastructure Construction: digital construction management technologies, promotes the use of digital construction management technologies on transportation infrastructure projects to reduce delivery time, reduce cost, develop more sustainable infrastructure, improve worker safety, and enable remote work. This bill will continue to drive Caltrans' evolving use of advanced project delivery technologies which will include advanced data collection technologies increasing the need for additional data storage space.

There is no consistent funding in place beyond the one-time funding approved in the FY 2022-23 BCP to fund projected FY 2024-25 data storage needs and enable annual expansion of storage and data protection – program data volumes are increasing each year driven by more transportation projects and the increasing use of technology for data and image collection which results in higher density images and larger file sizes.

In summary, this request will continue to fund a sustainable data storage and data protection program for Caltrans' current and long term needs in support of the increase in transportation project delivery, expanding use of data collection technology that efficiently and safely produces high resolution imagery and LiDAR point clouds (and larger data set sizes) and to respond to requests for historical transportation project data. In addition, this request will enable the completion of network upgrades associated with efficient access of the high-density data sets at selected locations throughout the state that began with funding in the approved FY 2022-23 BCP.

C. Departmentwide and Statewide Considerations

Caltrans 2020-2024 Strategic Plan alignment

The continued support of a fully funded, centrally managed Data Storage and Protection Program for Caltrans's programs collecting, storing, and archiving data as defined earlier in this request will ensure a flexible, robust, secure, and sustainable data storage and protection platform for Caltrans's mission critical project lifecycle workflows. In addition, the requested resources will enable the expanded use of technology to collect, analyze, and report data during and post project delivery for the increasing number of transportation projects being funded by state and federally funding sources. The permanent funding requested will enable Caltrans to fund maintenance on the storage equipment and provide funding for ongoing growth of storage capacity. This funding will also enhance the opportunity for uses of the data beyond the primary collection purpose (including roadway asset management, sign and pavement evaluation, structure inspection, rockslide threat analysis, and traffic operations). This request supports the following goals and strategies of the Caltrans 2020-2024 Strategic Plan:

Caltrans Goal: Safety First (Strategies: Leverage proven practices and accelerate advanced technology)

For the Right of Way and Land Survey and Construction divisions, the use of advanced data collection technology, including terrestrial and airborne LiDAR, improved data management tools, and adequate data storage capacity supports improved safety, engagement, and integrity. These Divisions have implemented innovative practices that allow for effective communication, collaboration, teamwork, and partnerships. In addition, this request promotes the use of industry best practices for data storage and protection by proactively planning the acquisition and management of current and future growth needs.

Caltrans Goal: Strengthen Stewardship and Drive Efficiency (Strategies: Standardize and modernize our equipment, facilities, technology, and supporting work practices; Enhance asset management and decision support tools; and promote and implement innovative and creative solutions.)

A recent example of Caltrans' innovative approach to driving efficiencies in the project delivery and maintenance programs also will drive additional needs for data storage capacities beyond current levels. The migration to a robust digital as-builts environment will streamline field inspection, with easy to use click graphics, specifications, checklists, and forms that will populate the asset management database for future use. Caltrans is investing in additional digital collection tools such as LiDAR, Unmanned Aerial Systems, Terrestrial LiDAR and RTK rover equipment used during construction to ensure quality placement of new assets as well as digitally collecting asset information. All these tools enable the collection of large amounts of data which requires additional storage capacity.

Other State level considerations include:

- Compliance with AB 1037 (09/22) which requires Caltrans to plan and deliver projects from inception to maintenance using more digital artifacts and tools which will continue to drive the increased need for data storage capacity; and
- The Federal Highway Administration's (FHWA's) increased emphasis on enhancing efficiency of transportation projects using evolving digital artifacts and toolsets during the initiation, design, construction, and maintenance processes. Recently enacted federal legislation, the IIJA (11/2021) includes funding for the use of advanced technologies to enhance efficiencies in the transportation project delivery and maintenance lifecycles.

D. Outcomes and Accountability

Outcomes

Caltrans expects the following outcomes from approval of this request:

- Provides adequate data storage to support continued implementation of virtual design and construction delivery methodologies that will improve efficiencies of the project delivery and maintenance processes as driven by the FHWA and California AB 1037 (09/22). For example, increased data storage capacity provides the foundation for continued expansion of the development and use of data collection activities (LiDAR, Photogrammetry, aerial imagery, drones, etc.)
- Enable Traffic Operations to expand the collection of Closed-Circuit Television Cameras (CCTV) data for selected segments of the State Highway System to enhance traffic management capabilities and aid in law enforcement activities.
- Continue the ongoing process for assessing Caltrans enterprise needs for primary, secondary, and archival data storage, not just single point solutions by business programs through the regular, ongoing engagement of Caltrans programs with Information Technology (IT) to assess data storage needs.
- Continue to improve data collection efficiencies by enabling storage and warehousing of large data collections for reuse.

Accountability

The Caltrans IT program will continue to meet regularly with Caltrans programs to assess data storage requirements. Annually, department-wide surveys will be conducted to collect business program drivers of data storage needs including near-terms requirements and expected data storage growth estimates.

E. Implementation Plan

On July 1, 2024, Program will initiate purchases for all additional storage and network hardware, as well as service contracts for maintenance of existing equipment and implementation services. On or before December 1, 2024, installation of the equipment will begin and be completed no later than June 30, 2025. Permanently allocated ongoing funds will be spent in the same pattern, with procurement in July, installation beginning in December and completed before June.

F. Supplemental Information (If Applicable)

Appendix 1 – Funding approved through FY 2022-23 Enterprise Data Storage BCP, Appendix 2 – Data Storage Needs Survey Summary

Appendix 1 – Funding approved through FY 2022-23 Enterprise Data Storage BCP

Resources	FY 22-23	FY 23-24
Positions	6	6
Primary, Secondary, Archival Data Storage	\$12,203,000	\$11,812,000
IT Infrastructure Equipment	\$ 4,000,000	\$ 2,500,000
Contract Services – Film Archive Conversion and Infrastructure Equipment	\$ 1,500,000	\$ 1,500,000
Totals (Rounded)	\$17,703,000	\$15,812,000

Appendix 2 – Data Storage Needs Survey Summary

#	Program	Division / District	Current Storage (Terabytes)	Current Storage Need (Terabytes)	Annual Growth (%)
1	Finance	Project Management - Asset Management (D6)	5	15	100%
2	M&O	Maintenance - Automated Pavement Condition	74	270	165%
3	M&O	Maintenance - D9 M&O	7	80	50%
4	M&O	Maintenance - D6	1.5	3.5	20%
5	M&O	Maintenance - Design SB 1	1	0.76	25%
6	M&O	Maintenance – Field D10	1	0.76	10%
7	M&O	Maintenance - Statewide Culvert Inspection Prog.	6	20	10%
8	M&O	Maintenance - Structure Maint. and Investigations	0	325	10%
9	M&O	Maintenance - Collaboration with partners	0	10	10%
10	M&O	Maintenance - Statewide Field Asset Collection	0	550	0%
11	M&O	Traffic Operations - Weigh-in-Motion	9.2	46	10%
12	M&O	Traffic Operations - TMC Uptime Tickets	0.4	1.06	5%
13	M&O	Traffic Operations - PeMS	65.5	75	15%
14	M&O	Traffic Operations - CCTV 90-day storage	0	140	TBD
15	M&O	Traffic Operations - Video Analytics	0	20	25%
16	M&O	Traffic Operations - V2I System	0	225	25%
17	M&O	Traffic Operations - Ramp Metering System	10	0	25%
18	M&O	Traffic Operations - TSMSS - Performance Measures	20	50	10%
19	M&O	Traffic Operations - ATMS/Active ITS	60	0	15%
20	PD	Right of Way - Land Surveys	185	862.9	25%
21	PD	DES - Aerial Survey Data (Photogrammetry + LiDAR)	40	90	25%
22	PD	DES - Historic Film Library	0	1200	0%
23	PD	DES - Other Sources (mostly CADD)	20	74	20%
24	PD	Environmental Analysis	17.1	2.4	15%
25	PD	Construction	300	1300	28%
26	PMP	California Integrated Travel Project	0	10	100%
27	PMP	Aeronautics	2	1	20%
28	PMP	Division of Transportation Planning	42.75	52.42	20%
		Total	867.45	5,424.80	

BCP Fiscal Detail Sheet

BCP Title: Enterprise Data Storage Expansion

BR Name: 2660-083-BCP-2024-GB

Budget Request Summary

	FY24					
	CY	BY	BY+1	BY+2	BY+3	BY+4
Operating Expenses and Equipment						
5340 - Consulting and Professional Services - External	0	750	0	0	0	0
5346 - Information Technology	0	12,123	10,195	10,195	10,195	10,195
Total Operating Expenses and Equipment	\$0	\$12,873	\$10,195	\$10,195	\$10,195	\$10,195
Total Budget Request	\$0	\$12,873	\$10,195	\$10,195	\$10,195	\$10,195

Fund Summary

Fund Source - State Operations						
0042 - State Highway Account, State Transportation Fund	0	12,873	10,195	10,195	10,195	10,195
Total State Operations Expenditures	\$0	\$12,873	\$10,195	\$10,195	\$10,195	\$10,195
Total All Funds	\$0	\$12,873	\$10,195	\$10,195	\$10,195	\$10,195

Program Summary

Program Funding						
9900100 - Administration	0	12,873	10,195	10,195	10,195	10,195
Total All Programs	\$0	\$12,873	\$10,195	\$10,195	\$10,195	\$10,195