

Rep. Edward Vigil, Chair  
Rep. KC Becker  
Rep. J. Paul Brown

Sen. Randy Baumgardner, Vice-Chair  
Sen. John Kefalas  
Sen. Jerry Sonnenberg



## Capital Development Committee

State Capitol Building, Room 029  
Denver, Colorado 80203-1784  
(303) 866-3521



October 9, 2015

Senator Tim Neville, Chair, Joint Technology Committee  
State Capitol Building  
200 East Colfax  
Denver, Colorado 80203

Dear Senator Neville:

On October 19, 2015, the Capital Development Committee (CDC) will consider three requests to waive the six-month encumbrance deadline pertaining to information technology (IT) projects, pursuant to Section 24-30-1404 (7), C.R.S. These IT projects were approved by the Joint Technology Committee (JTC) in FY 2015-16. Descriptions of the requests are attached, and Table 1 below summarizes the requests.

The CDC annually considers requests to waive the six-month encumbrance deadline for projects in the capital construction section of the Long Bill. Current law requires contracts for capital projects to be executed and encumbered within six months of the date on which an appropriation becomes law. For FY 2015-16 projects included in the Long Bill, this deadline is October 23, 2015. If this deadline cannot be met for a particular project, the state agency or institution of higher education responsible for the project may request a waiver from the CDC. If approved by the CDC, the Office of the State Controller typically grants a deadline waiver. If a waiver is not requested or approved, spending on behalf of the project may be restricted by the Office of the State Controller.

FY 2015-16 is the first year IT capital projects were approved by the JTC for inclusion in the capital construction section of the Long Bill. While current law requires the CDC to consider waiver requests for these projects, the CDC believes it is appropriate to refer the requests to the JTC for review. For future budget cycles, the CDC and JTC may want to consider recommending a statutory change so that requests to waive the six-month encumbrance deadline for projects can be approved by the respective committees.

After the JTC's consideration of these waiver requests at its meeting on October 22, 2015, the CDC will inform the Office of the State Controller of the JTC's recommendations.

**Table 1**  
**Capital Development Committee Referral to the Joint Technology Committee**  
**Regarding Six-Month Waiver Requests**

<b>Agency</b>	<b>Project</b>	<b>Waiver Request</b>	<b>Fund Source</b>
Department of Personnel and Administration	Collections System Replacement	\$13,911,135	CF
Department of Human Services	Information Technology Systems Interoperability	\$1,281,594 \$11,534,346	CCF FF
Department of Human Services	Child Welfare Case Management System Replacement	\$4,648,707 \$2,175,860	CCF FF

If you have any questions or concerns about the CDC's referral of these waiver requests, please call Kori Donaldson, Legislative Council Staff, at 303-866-4976.

Sincerely,



Representative Ed Vigil  
Chair, Capital Development Committee

- c: Joint Technology Committee Members  
Capital Development Committee Members  
Kori Donaldson, Capital Development Committee Staff

# WAIVER REQUEST -- October 22, 2015

FY 2015-16 Request to Waive the Six-Month Encumbrance Deadline Pursuant to Section 24-30-1404 (7), C.R.S.

## Personnel and Administration *Collections System Replacement*

**MOTION** Recommend to the Capital Development Committee that a waiver request be granted for the FY 2015-16 appropriation to the Collections System Replacement project (\$13,911,135).

### SUMMARY

2016-038

The Department of Personnel and Administration is requesting a waiver of the six-month encumbrance deadline for the FY 2015-16 appropriation to the Collections System Replacement project. DPA requested this waiver concurrent with the FY 2015-16 request because it was aware that procuring the performance-based contract would take more than six months. DPA recently held vendor demonstrations for the project, and it is anticipated that a vendor will be selected within the next three to four weeks.

The project replaces the current Columbia Ultimate Business Solutions (CUBS) system and will automate the accounting entries and actions necessary to successfully manage the large volume of collections-related data processed by the department's Central Collections Program. The project will generate new revenue which will be used to pay for the project and annual maintenance costs for four years. The underlying funding mechanism that supports the implementation of the collections module relies exclusively on revenues generated by the contractor under the performance contract. Once the vendor begins working with the state on redesigning business processes, additional revenue will be generated. DPA believes that the additional revenue will be generated within the next year.

### FY 2015-16 APPROPRIATION AMOUNT

Fund Source	Appropriation
CF	\$13,911,135
<b>Total</b>	<b>\$13,911,135</b>

### STAFF QUESTIONS

All responses to staff questions were incorporated into the project write-up.

# WAIVER REQUEST -- October 22, 2015

FY 2015-16 Request to Waive the Six-Month Encumbrance Deadline Pursuant to Section 24-30-1404 (7), C.R.S.

## Human Services *Child Welfare Case Management System Replacement*

**MOTION** Recommend to the Capital Development Committee that a waiver request be granted for the FY 2015-16 appropriation to the Child Welfare Case Management System Replacement project (\$6,824,567).

### SUMMARY

2016-012

The Department of Human Services (DHS) is requesting a waiver of the six-month encumbrance deadline for the FY 2015-16 appropriation to the Child Welfare Case Management System Replacement project. DHS is requesting this waiver because the project requires approval from the federal Administration for Children and Families (ACF) prior to the issuance of a request for proposal (RFP). In September 2015, the department submitted the RFP for the project to ACF for review. ACF has asked for changes to the RFP and for documentation on the overall design of the project before moving forward with approval of the federal funds. Full approval by ACF and vendor selection is anticipated by January 2016.

The project enhances and modernizes Colorado's current statewide Automated Child Welfare Information System, also known as the Trails compliant case management system, and associated infrastructure. The project will modernize Trails to allow for faster implementation of system modifications and to accommodate changing child welfare practices.

### FY 2015-16 APPROPRIATION AMOUNT

Fund Source	Appropriation
CCF	\$4,648,707
FF	\$2,175,860
<b>Total</b>	<b>\$6,824,567</b>

### STAFF QUESTIONS

All responses to staff questions were incorporated into the project write-up.

# WAIVER REQUEST -- October 22, 2015

FY 2015-16 Request to Waive the Six-Month Encumbrance Deadline Pursuant to Section 24-30-1404 (7), C.R.S.

## Human Services *IT Systems Interoperability*

**MOTION** Recommend to the Capital Development Committee that a waiver request be granted for the FY 2015-16 appropriation to the IT Systems Interoperability project (\$12,815,940).

### SUMMARY

2016-013

The Department of Human Services (DHS) is requesting a waiver of the six-month encumbrance deadline for the FY 2015-16 appropriation to the IT Systems Interoperability project. DHS is requesting this waiver because the project requires approval from the federal Centers for Medicare and Medicaid Services (CMS) prior to the receipt of federal funds. CMS is providing a 90/10 federal/state match for the project. CMS did not begin the approval process until the state demonstrated that the 10 percent match was available (through the 2015 Long Bill appropriation). In July 2015, DHS and the Department Health Care Policy and Financing engaged CMS in the approval process for federal funding. A subject matter expert for the project has also been procured. Full approval by CMS is anticipated by March 2016.

The project standardizes all existing IT systems under an interoperability environment by allowing the systems to exchange information through interfaces. Without removing the data from the core system, the project adds necessary technology components, security, and governance while allowing the data to be available to users.

### FY 2015-16 APPROPRIATION AMOUNT

Fund Source	Appropriation
CCF	\$1,281,594
FF	\$11,534,346
<b>Total</b>	<b>\$12,815,940</b>

### STAFF QUESTIONS

All responses to staff questions were incorporated into the project write-up.



**COLORADO**

Office of State Planning  
& Budgeting

111 State Capitol  
Denver, Colorado 80203

October 1, 2015

Senator Tim Neville  
Chair, Joint Technology Committee  
State Capitol Building  
200 E. Colfax Ave.  
Denver, CO 80203

RE: OSPB Submission of FY 2016-17 Non-prioritized Information Technology Capital Requests

Dear Senator Neville:

As required by § 24-37-304 (1) (c.5) (I), C.R.S., please find attached the FY 2016-17 Executive Branch information technology requests for all state departments other than the Department of Higher Education. Please note that these requests have not yet been prioritized or recommended for funding. Prioritization and funding recommendations will be presented to the Joint Technology Committee (JTC) by November 2, 2015.

Given the significant challenges facing Colorado's General Fund budget in FY 2016-17, we will likely recommend only a very small number of projects in our November 2, 2015 prioritization, based on the following criteria:

- Projects that are funded by cash funds and/or federal funds;
- Requests for continuation projects appropriated in FY 2015-16; and
- Projects with clear and urgent life or safety implications.

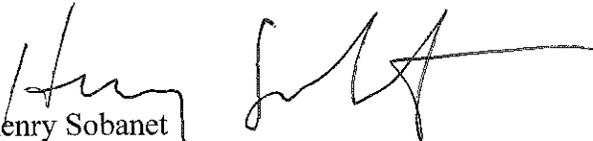
In addition, please note that today's submission does not include a request surrounding the premium and benefits system for Unemployment Insurance. You have already been informed that some significant challenges have arisen with the UI project, commonly known as WyCAN, entered into by a consortium of States including Arizona, North Dakota, Wyoming, and Colorado. The Department of Labor and Employment continues to investigate the impact of these challenges on the WyCAN project, and will present a plan to the JTC for addressing these challenges at a later date.

Please feel free to contact me by phone at (303) 866-3317, or direct questions and concerns via email to our Deputy Director, Erick Scheminske, at [erick.scheminske@state.co.us](mailto:erick.scheminske@state.co.us). At the Committee's request, I will also make myself available to present any necessary information at a future meeting.



Thank you for your consideration of these requests.

Sincerely,

  
Henry Sobanet  
Director

- cc: Representative Max Tyler, Vice-Chair, JTC
- Representative Jonathan Singer, JTC
- Representative Jack Tate, JTC
- Senator Linda Newell, JTC
- Senator Beth Martinez-Humenik, JTC
- Ms. Jessika Shipley, JTC Staff
- Mr. Matt Becker, JTC Staff
- Mr. John Ziegler, JBC Staff Director
- Mr. Alfredo Kemm, JBC Staff
- Mr. Kevin Neimond, JBC Staff
- Ms. Kori Donaldson, CDC Staff
- Ms. Diane Duffy, CDHE
- Mr. Andrew Rauch, CDHE
- Mr. Erick Scheminske, Deputy Director, OSPB
- Ms. Andrea Day, OSPB Staff
- Mr. Nathaniel Pearson, OSPB Staff



**CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17**

Agency or Institution:	Human Services	Department/Division Approval:	<i>Melissa Buchert</i>
Project Title:	Child Care Automated Tracking System (CHATS) Modernization	Signature:	<i>Melissa Buchert</i>
Project Year(s):	FY 2015-16 to FY 2019-20	COHE Approval:	
Agency or Institution Priority Number:	3	Signature:	<i>David M. Smith</i>
Program Plan:		OSP Approval:	10/1/15
		Name and e-mail address of preparer:	

9-30-15

Revision?	Yes	No	Total Project Costs	Total Prior Year Appropriations	Current Request FY 2016-17	Year 2 Request	Year 3 Request	Year 4 Request	Year 5 Request
(1)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
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(7b)				0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
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(9)			\$ 2,381,250	\$ 1,198,125	\$ 1,183,125	\$ -	\$ -	\$ -	\$ -
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(2)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5a)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5b)				0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(6)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(1)			\$ 1,050,000	\$ 345,000	\$ 345,000	\$ 90,000	\$ 90,000	\$ 90,000	\$ 90,000
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(4b)				0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(5)			\$ 1,050,000	\$ 345,000	\$ 345,000	\$ 90,000	\$ 90,000	\$ 90,000	\$ 90,000
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(6)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(1)			\$ -	\$ 900,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000
(2)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5)			\$ -	\$ 900,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000
			\$ 2,991,250	\$ 1,533,125	\$ 1,438,125	\$ -	\$ -	\$ -	\$ -
(1)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
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(3)			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
			\$ 2,991,250	\$ 1,533,125	\$ 1,438,125	\$ -	\$ -	\$ -	\$ -
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			\$ 2,991,250	\$ 1,533,125	\$ 1,438,125	\$ -	\$ -	\$ -	\$ -





- The hybrid option consists of a set of thirteen technical and non-technical initiatives to address the gaps and system requirements identified by CHATS users, providers, the Office of Information Technology (OIT), and the Office of Early Childhood (OEC).
- The four non-technical (NT) initiatives relate to (NT.1) a strategic technology plan to define technical priorities, (NT.2) increased staffing initiatives, (NT.3) additional user training, and (NT.4) planning for attendance tracking replacement, as opposed to fundamental system flaws or technology issues.
- The needs assessment identified nine technical initiatives that are needed to address gaps and system requirements. These initiatives can be further categorized as non-functional, functional, or business requirements.

**Background and Justification:**

The CHATS system was deployed in 2010 to update technology and address business needs related to tracking attendance, improving financial management, and improving access to data. However, the system lacks some major scope items which users were expecting, including robust reporting capabilities, a provider portal, and a fully-staffed operations and maintenance team. This led to manual workarounds and maintenance of paper-based and parallel monitoring and tracking systems, which are not advisable or sustainable business practices for long-term efficiency, since they introduce opportunities for data entry and other human errors, are not easily auditable, add to user workload, and cause user frustration. The following are the summarized highlights of the most frequently reported and highest impact challenges in the current business and technical environments:

- CHATS does not have functionality to support all state-wide policies, such as assessing the correct parent fee, managing unpaid parent fees, preventing manual claims, and recovering overpayments; and certain county policy options, such as “hold days,” drop-in days, and tiered reimbursement.
- Existing functionality does not effectively support complaints and investigations or fraud prevention.
- Many users dislike the Point-of-Sale (POS) system, citing technical problems, user issues with the POS cards, burden on parents and providers.
- Some providers have chosen to no longer be Colorado Child Care Assistance Program (CCCAP) providers, or have been reluctant to become providers, due to the challenges and administrative burdens of the current tracking and attendance system.
- Limited standard reports and lack of ad hoc reporting or querying capabilities severely hinder state and county staff at all levels. Counties and the State have very limited access to program data to conduct program planning, monitoring, and analysis, budgeting, needs assessments, or auditing.

State and county staff spend a significant amount of time and effort tracking down data to complete core business processes. Much of the information they seek is in CHATS, but they lack access to it in a format and timeframe that meets their needs.

**Implementation Plan:**

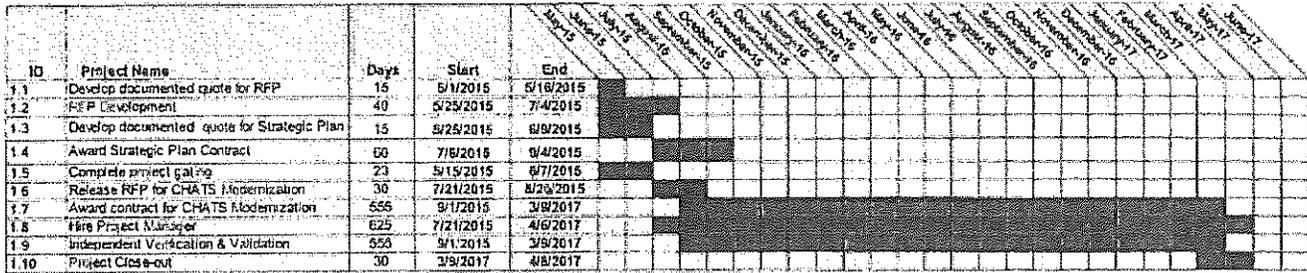
Based on the BerryDunn recommendation, the Department is utilizing a hybrid strategy to implement CHATS modernization. Rather than replace the system in its entirety, the project will incrementally replace and upgrade key modules in a prioritized fashion. The needs assessment identified the hybrid solution as “more cost effective, time efficient, and less risky than full system replacement”.

As noted in the attached timeline, the Department chose to have a third-party vendor develop the specifications and requirements for the RFP. The Department used a documented quote process to evaluate

proposals for the drafting of the RFP. Based on those proposals, the Department selected BerryDunn to draft the RFP. Given their prior history with the CHATS system, as well as the Department's programs, BerryDunn was uniquely qualified to provide both insight and added value to the project.

Also consistent with the initial recommendation, the Department contracted with BerryDunn to conduct a Strategic Technology Plan for the OEC (see Figure 1.1). This plan will provide a technology, business process, and business strategy roadmap for all programs within the OEC. The strategic plan is scheduled to be completed prior to the award of the modernization RFP, and will provide bidders with a detailed assessment of the Department's future vision for information technology systems.

Figure 1.1



**Alignment with OIT Best Practices:**

Due to its scope and complexity, the State OIT Executive Governance Committee (EGC) classified the project as a "large project". As such, the Department is required to follow a structured format with increased levels of oversight, validation, and reporting.

- **Gate 1: RFP Development** – The Department sought the expertise of the third-party vendor developed requirements and specifications for the RFP. The vendor conducted extensive stakeholder outreach and engagement in establishing business requirements. The OIT staff is also heavily consulted.
- **Gate 2: OIT Gating Process** - As a large project, the CHATS Modernization project must follow the established OIT gating process. This system requires that all projects undergo critical review and approval for each major step of the process. This review includes a critical assessment of the risks, resources, activities, deliverables and controls for each task. The project must successfully pass through each gate before being allowed to proceed to the next. The gates include intake, initiation, planning, execution, and closing. The project's overall progress is reviewed monthly by the EGC.
- **Gate 3: Project Management** – To ensure successful completion of the project, the Department has engaged the services of a Certified Project Manager for the duration of the project. This position is responsible for overseeing all activities related to the contract including vendor management, resource allocation, schedule and budget adherence, quality control, and performance management.
- **Gate 4: Independent Verification and Validation (IV&V)** - As another layer of quality control and oversight, the Department budgeted for an IV&V vendor for the duration of the project. This is an independent third-party consultant that assesses, verifies, and validates the work of the RFP vendor to ensure it is being completed in accordance with requirements and specifications.

**Security and Backup/Disaster Recovery:**

All phases of the project require OIT approval and sign-off on all security, backup, and disaster recovery processes. Formal security validation is obtained in Gate 4, Execution. Approval of the final security profile and backup requirements is required prior to a Go / No Go decision for the project.

The system will have redundant IT components and is designed to meet federal and State IT architecture, security and business continuity requirements. CHATS Modernization will follow the State Cybersecurity Policies set forth by the Office of Information Security. It will also follow the National Institute of Standards and Technology (NIST) 800-53 guidelines that focus on access management and identity management for implementing electronic authentication. NIST defines Identity Management or IDM as “a process of establishing confidence in user identities that are electronically presented to an information system.”

**Business Process Analysis:**

There are several benefits to implementing the hybrid enhancement including:

- The Electronic Document Management System will enable Colorado Child Care Assistance Program (CCCAP) case workers to view eligibility documentation obtained by CCCAP and other programs, and to upload CCCAP-specific documentation.
- Enhancements to the CHATS database infrastructure to utilize the Office of Information Technology’s Database as a Service (DAAS) initiative, removing the current environment barriers to real-time reporting.
- The Hybrid approach establishes user training as a core CCCAP business function through training planning, revision of training materials and user documentation, and on-going assessment of training needs and activities.
- The Hybrid approach will make changes to CHATS financial functionality to address system gaps related to management and tracking of billing, payments and recoveries.
- CHATS will be linked to Quality Rating Improvement System (QRIS) for quality and licensing system data.
- Improvements will be made to the CHATS user interface, screen flow, and data entry to enhance worker productivity.
- The enhancements will provide the ability to record and store information about complaints and investigations related to qualified (non-licensed) providers.
- Without the interface to the Quality Rating and Improvement System, time-consuming manual processes will be needed to implement requirements for tiered reimbursement.

**Systems Integration Opportunities:**

CHATS has tremendous potential for systems integration opportunities. As noted, it is integrated with Trails (the Department’s automated child welfare case management system), the Child Care Licensing System (CCLS), PEAK (the Department’s universal application system), the Quality Rating Improvement System (QRIS) and the electronic benefit tracking system. The modernization of CHATS is consistent with the Department’s strategic vision of an integrated technology framework. Within this framework, data reside within the databases of their own core systems, but can be easily and safely accessed in an integrated fashion, while the user interfaces reside on a separate platform that seamlessly and dynamically interacts with the customer.

**Program Plan:**

One of the main benefits of the hybrid approach is its ability to maximize the technology. The Department is currently in various stages of rebuilding or replacing several major IT systems. This allows the

opportunity for leveraging and sharing technology, infrastructure, operating platforms and software licenses. The use of common architecture provides efficiencies in ongoing operations and support.

**Life Cycle Cost (LCC) Analysis and Project Alternatives:**

The solution recommended by BerryDunn to enhance and modernize CHATS is the Hybrid option. This option is the most cost effective solution, maintains the integrity of the current infrastructure, meets all user objectives, and allows work to begin immediately through a phased in approach. There are also benefits in terms of quantitative cost savings:

**Figure 1.2 Comparison of GHATS Modernization Option Costs**

	Cost	Hybrid	Difference
Do Nothing	\$28,000,000	\$8,916,250	(\$19,083,750)
Enhancement (Non-Hybrid)	\$3,000,000	\$8,916,250	\$5,916,250
CHATS Replacement	\$20,000,000	\$8,916,250	(\$11,083,750)

There are clear cost savings by using the recommended Hybrid option over Do Nothing and CHATS Replacement. The Enhancement option is the least expensive, but also one of the least viable, feasible, and financially responsible. This option does not replace system components in need of upgrades and modifications, and only meets some user objectives investing further financial resources to stabilize the system without addressing the need for new technology. Furthermore, issues in the current CHATS system will persist such as, the continued accumulation of technical debt, the future (approximately five years) need for a lifecycle refresh and complete system replacement, continued technical problems, and the potential loss of CCCAP data.

**Consequences if Not Funded:**

Without the Hybrid enhancements, the current system will not allow the Department to adequately and efficiently meet the needs of the families served.

**Request for Proposal:**

For contracted services, the Office of Early Childhood will create strict RFP guidelines to ensure timely and high quality work. While individual contracts will be negotiated separately, all contracts and contracted services will ensure that vendors are held accountable. This will be done by setting firm timelines and milestones, and having each vendor agree to certified project management and independent validation and verification. Finally, damages and penalties will be imposed on vendors who fail to provide deliverables or fail to meet timelines. For example, the success of a project is often dependent upon promptly mobilizing and deploying the appropriate staff. Based on this, the Department will include strong requirements and related penalties to vendors who do not “ramp up” according to schedule. Conversely, the Department is also willing to consider incentives for contractors who provide “value engineering” by providing a solution that is more efficient or effective than the original specification. The development phase will be completed at the end of year two, and user testing will begin in year three.

**Operating Budget Impact:**

The key components of the operating budget are personnel costs and Common Off-the-Shelf Software (COTS). The COTS costs are estimated to be \$345,000 per year during development, and \$90,000 per year once the system is in the operating and maintenance stage. Personnel costs are estimated to be \$900,000 in

the first year for approximately 9.0 FTE; those costs increase to \$1.2 million and 12.0 FTE in FY 2016-17 and beyond. The Department prepared the following cost analysis table to summarize the 5-year operating budget impact.

Budget Item	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	Total
Software COTS	\$ 345,000	\$ 345,000	\$ 90,000	\$ 90,000	\$ 90,000	\$ 960,000
Operating Cost	\$ 900,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 5,700,000
Estimated Total	\$ 1,245,000	\$ 1,545,000	\$ 1,290,000	\$ 1,290,000	\$ 1,290,000	\$ 6,660,000

**Assumptions for Calculations:**

Assumptions and calculations to incrementally enhance and replace the existing CHATS modules are based on the detailed cost analysis of the Hybrid option as prepared by BerryDunn. The needs assessment provided an estimated five-year cost range of \$5.1 million to \$8.8 million. The Department’s request is at the higher end of the range to account for contingencies and ensure successful completion of the project. The projected cost is \$8,961,250. The additional cost of \$161,250 is also requested for the Office of Information Technology (OIT) to employ a Certified Project Manager, perform Independent Verification and Validation and to temporarily lease space for development. These requirements were not factored into the BerryDunn assessment.

**Total Five-year Project Costs**

The needs assessment includes the projected five-year cost of the project, including one-time and ongoing costs. Figure 1.4 shows the five-year project cost by category according to the recommendations by Berry Dunn.

Budget Item	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	Total
<b>FY 2015-16 BA-13: CHATS Operating and Maintenance</b>						
Operating and Maintenance	\$900,000	\$1,200,000	\$1,200,000	\$1,200,000	\$1,200,000	\$5,700,000
<b>FY 2015-16 Capital Construction Request BA-01: CHATS Hybrid Enhancement</b>						
Contract Personal Services	\$1,188,125	\$1,113,125	\$0	\$0	\$0	\$2,301,250
Software COTS	\$345,000	\$345,000	\$90,000	\$90,000	\$90,000	\$960,000
Estimated Total	\$2,433,125	\$2,658,125	\$1,290,000	\$1,290,000	\$1,290,000	\$8,961,250

**Operating Costs**

The BerryDunn assessment recommended immediately deploying 12.0 FTE resources to provide the appropriate level of ongoing support and maintenance. The FY 2015-16 request was for 9.0 FTE contracted resources to account for the time required to onboard those resources; the amount will annualize to 12.0 FTE contracted resources in FY 2016-17 and beyond (See Figure 1.5). It is important note that the BerryDunn analysis consistently refers to personnel resources rather than State FTE. The current OIT business model is designed to allow the maximum flexibility in determining the optimal staffing structure

for each project. The Department will work with OIT to identify the appropriate mix of State staff, contract staff, or hosted services.

**Figure 1.5 - Personal Services Operating Cost**

Budget Item	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	Total
<b>Operating Costs</b>						
FTE Resources	9.0	12.0	12.0	12.0	12.0	n/a
Annual Cost	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
	\$ 900,000	\$1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$5,700,000

\* Operating and maintenance costs and rates are based on the recommendations from the BerryDunn report for necessary system support of 12.0 FTE resources. The Department and OIT will identify the best appropriate mix of State staff, contract staff, or hosted services to support business needs. The Year-1 costs are calculated at 9.0 FTE to account ramp up of new resources.

**Contract Personal Service Cost**

The costs for contract personal services were derived from the BerryDunn assessment. In discussions with OIT as well as BerryDunn, the Department is requesting the high estimate based on the complexity of the project. The Department has also included costs for Independent Verification and Validation (IV&V) as well as a Certified Project Manager as required by OIT on projects of this scope (See Figure 1.6).

The lower cost estimate from the needs assessment for the Hybrid option was \$5,145,000. This estimate was arrived at by reducing resources in each key area: technology cost, one time development costs, and a lower level of ongoing and maintenance support. The high estimate was chosen to ensure capacity to make timely system changes. The Department has several other information technology projects underway that will interface with CHATS at some level. Because of the high level of interdependencies between the various projects, the Department believes a more robust effort is justified.

**Figure 1.6 - Contract Personal Services (2-Year Development)**

Budget Item	FY 2015-16 (Appropriated)	FY 2016-17 (Continuation)	Total
<b>Consultant Resources *</b>			
Hours	5,500	5000	10,500
Rate	\$150	\$150	n/a
	\$825,000	\$750,000	\$1,575,000
* Estimated hours are based on BerryDunn report; rates are from the United States General Services Administration (GSA) Information Technology Services Schedule			
<b>State Resources *</b>			
FTE Resources			
(OEC Business Analyst)	1.5	1.5	3.0
Annual Rate	\$100,000	\$100,000	n/a
	\$150,000	\$150,000	\$ 300,000
Sub Total	\$975,000	\$900,000	\$1,875,000
* Estimated hours and rates are based on BerryDunn report.			
<b>Certified Project Manager *</b>			
FTE Resources	1.0	1.0	2.0
Annual Rate	\$125,000	\$125,000	
Sub Total	\$125,000	\$125,000	\$250,000
* Estimated hours are based on BerryDunn report; rates are (GSA) Information Technology Services Schedule			
<b>Independent Verification and Validation (IV&amp;V)</b>			
Estimated Development Cost	\$1,237,500	\$1,237,500	
5% IV&V	\$61,875	\$61,875	
Sub Total	\$61,875	\$61,875	\$123,750
* Estimated Development Cost includes software acquisition (\$600,000) and personal services cost (\$1,875,000). IV&V costs are based on 5% of total development costs over the 24-month development period.			
<b>Leased Space (Temporary)</b>			
Number of Temporary Staff (State and Contract)	10.0	10.0	
Average Square Feet per Employee (including common areas)	125.0	125.0	
Gross Square Footage	1,250.0	1,250.0	
Cost per Square Foot	\$21.00	\$21.00	
Sub Total	\$26,250	\$26,250	\$52,500
* Leased space assumes an average of 125 s/f per employee; rates based on Downtown Denver Partnership 2014 Economic Update			
<b>Total Contract Professional Services</b>	<b>\$1,188,125</b>	<b>\$1,113,125</b>	<b>\$2,301,250</b>

**Commercial-Off-the-Shelf Software (COTS)**

The commercial-off-the-shelf-software costs were derived from the BerryDunn assessment. The software acquisition and development expenditures occur in the first two years of the project. Thereafter, the ongoing costs for COTS licensing or hosting is calculated at 15% of the total acquisition cost (See Figure 1.7).

Figure 1.7 - Software Acquisition						
Budget Item	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	Total
<b>Software Commercial Off-the-Shelf Software (COTS) *</b>						
Annual Cost	\$300,000	\$300,000	\$90,000	\$90,000	\$90,000	\$870,000
	\$300,000	\$300,000	\$90,000	\$90,000	\$90,000	\$870,000
*The cost in Year-1 and Year-2 are for the estimated cost for acquisition or renewal of required software license (\$600,000). Ongoing maintenance cost is calculated at 15% of original licensing and development cost. These costs do not begin until the system is operational in Year-3 of the request (\$90,000/year).						
<b>Software Build</b>						
Annual Cost	\$45,000	\$45,000	\$ -	\$ -	\$ -	\$90,000
	\$45,000	\$45,000	\$ -	\$ -	\$ -	\$90,000
*The development cost in Year-1 and Year-2 are based on the BerryDunn assessment.						
<b>Total</b>						<b>\$960,000</b>

**Cost Savings and Improved Performance Outcomes:**

The BerryDunn "Best Practices Report" recommends a combination of initiatives that have the potential for future cost savings. First, the "RFI for Attendance Tracking" recommendations notes that the ability to record attendance digitally and in real time greatly improves the accuracy of billings and also reduce fraud. Louisiana, Wisconsin, Texas, Mississippi, New York, and Iowa are among the states that have implemented technology that supports fraud reduction.

Additionally, the "Fraud, Recovery and Administrative Controls" analysis states that, "Robust reporting capabilities, Red Flag Fraud Alert Reports, automatic flags triggered by unusual activity, and open access to data, including data from other agencies that can be cross-referenced, are important for proactive fraud detection." The Department believes this added functionality within the reporting module will enhance fraud detection and improve fraud deterrence.

The Department conservatively estimates these two recommendations have the potential to reduce fraud by \$477,854 in the first full year of operation (See table below).

CHATS Anticipated Cost Savings		
FY2013-14 CCCAP Expenditures		\$63,713,812
POS Real-time Tracking Estimated Savings	0.25%	(\$159,285)
Robust Reporting and Red Flag Monitors Savings	0.50%	(\$318,569)
<b>Total Estimated Annual Savings</b>		<b>(\$477,854)</b>

<b>ADDITIONAL REQUEST INFORMATION</b>	
Date of project's most recent program plan:	6/30/2015
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New <input type="checkbox"/> Renovation <input type="checkbox"/> Expansion <input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	ASF GSF
Is this a continuation of a project appropriated in a prior year?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?	2016-039115

<b>CONTINUATION HISTORY (DELETE IF NOT APPLICABLE)</b>		
	FY 2015-16 Appropriated	Total Appropriations
<b>Total Funds</b>	\$1,533,125	\$1,533,125
<b>General Fund</b>		
<b>Cash Funds*</b>		
<b>Reappropriated / CFE</b>		
<b>Federal Funds</b>	\$1,533,125	\$1,533,125

<b>ESTIMATED PROJECT TIME TABLE</b>		
Steps to be completed	Start Date	Completion Date
Phase 1 Construction	July 1, 2015	June 30, 2016
Phase 2 Construction	July 1, 2016	June 30, 2017







systems and environment. The Interoperability plan, timeline, costs, and resulting budget request were all derived as a result of that 15-month planning effort.

The Office of Management and Budget (OMB) Circular A-87 cost allocation waiver for integrated health and human service system development, originally set to expire December 31, 2015, has been extended to December 31, 2018.

Utilizing Interoperability to enable individual and family centric views of data across IT systems will allow for greater transparency and improved accountability within the Department, resulting in better service delivery for clients.

The Department currently has no standard policy, procedure or practice addressing interoperability. A study of just 18 of the Department's IT systems revealed that it has over 500 interfaces to move data to a total of 95 federal, state, and county IT systems using 28 different methodologies. The Department has no ability to view or analyze data as a comprehensive whole, in anything close to near real time or without enormous manual effort.

The new connected model approach utilized in the Department's interoperability strategy provides a roadmap for improved business process and program performance throughout the entire organization resulting from:

- The selection and deployment of new foundation technologies is based on service oriented architecture (SOA) that enables cross-agency collaboration, information access, and process coordination.
- Creation of a connected 'hub' or Enterprise Service Bus (ESB) that provides a user with individual and family centric views of data and enables performance management capabilities across the offices of the Department and across partnering agencies through a 'single pane view' using single sign-on methodology.
- Enhancing and extending existing applications by developing shared services that can be leveraged by multiple agencies and business processes.
- Assessment of current business processes that will be affected by the new enterprise architecture and identifying areas that will benefit from improved processes and procedures prior to the implementation of the new technologies.

This strategy is built upon existing technology infrastructures, thus facilitating incremental technology investment, such as implementation of new standards, common applications, and organization and process changes, consistent with emerging best practices in the industry.

Some of the factors that have increased the demand for a connected model of interoperable systems include:

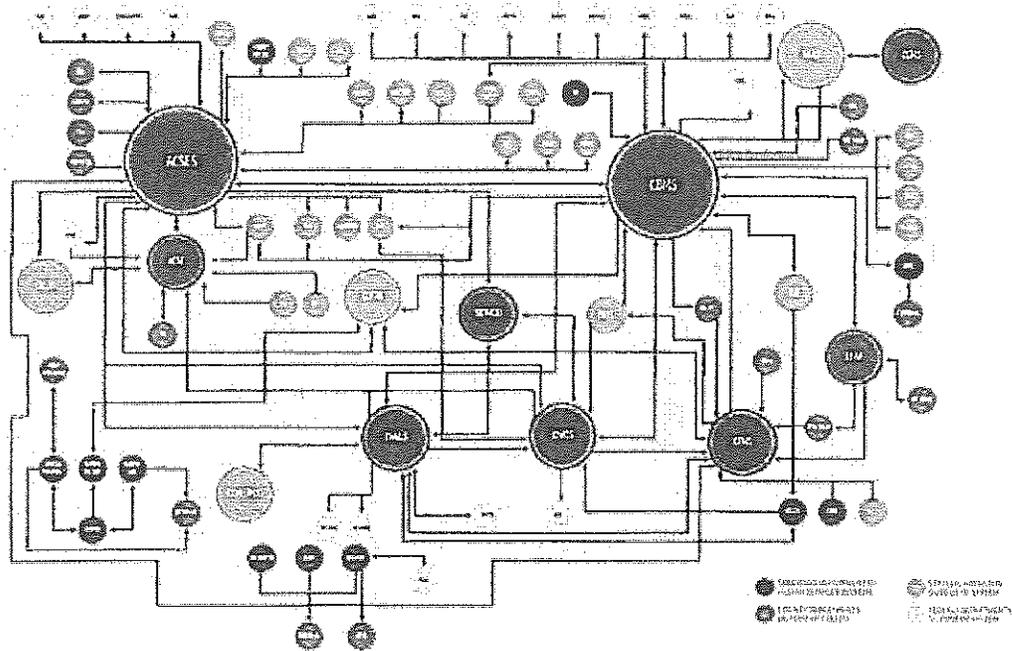
***Faster access to services.*** Multiple, redundant intake and eligibility systems, spread across different agencies and locations, discourage individuals and families from seeking care. Similarly, the public must be able to easily identify and access community resources.

***Casework simplification.*** Simplifying business and technical processes enable caseworkers to spend less time on data entry and manual reporting and more time with clients.

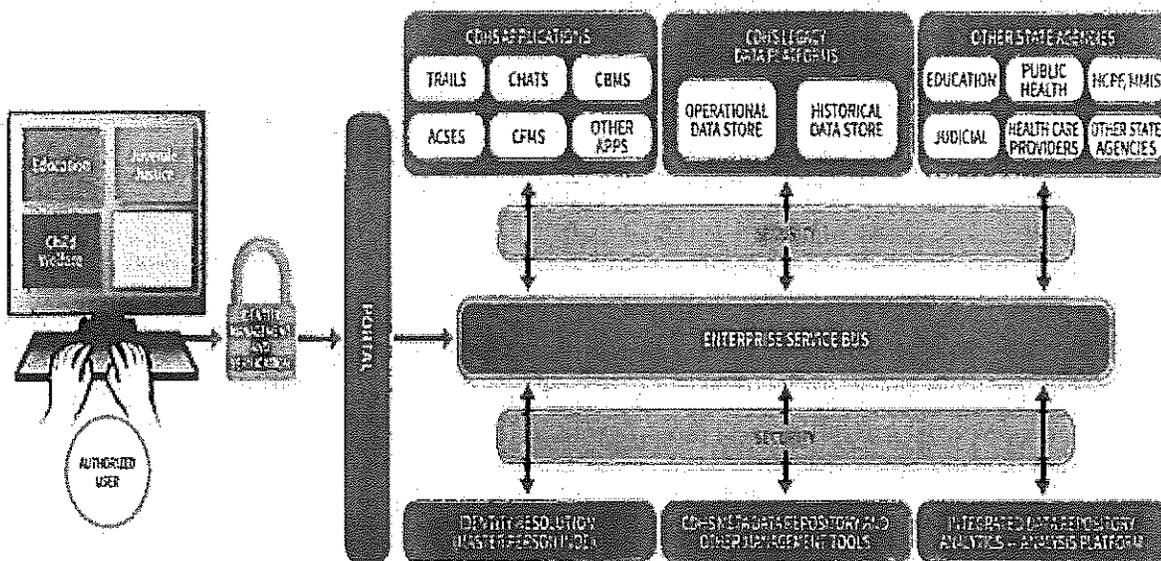
**Safety.** The demand for coordination is heightened when it can increase the safety of individuals, families and communities.

**Outcome measurements.** A global view of clients, services and resource distribution within and across departments and programs, provides meaningful metrics for measuring outcomes.

In summary, Interoperability transforms the Department's data environment from the depiction below:



To this modernized environment:



**Implementation Plan:**

The Interoperability Roadmap<sup>1</sup> provides multiple work streams of initiatives through a phased approach to interoperability. In addition, the Roadmap provides opportunity for successes throughout the plan and lessons learned that will feed into a larger and fully developed implementation strategy.

Governance Work Stream

Activity	Tasks	Deliverable
Create initial interoperability and data governance organization	<ul style="list-style-type: none"><li>• Build governing council teams to include business data experts, a data architect, business analysts, and a project manager</li><li>• Establish venues in which the experience and expertise of individuals is shared and leveraged to facilitate interagency collaboration and partnership</li><li>• Leverage existing Human Services and Health IT associations to encourage the sharing of knowledge, experience and solutions</li><li>• Develop processes to engage DHS business leadership in strategic interoperability and data planning activities to ensure that business requirements are being met</li><li>• Establish a formal communication path with OIT for the Interoperability Advisory Council (IAC)/Data Governance Councils</li></ul>	<i>Initial IAC/DGC Governance Structure</i>

<sup>1</sup> <http://www.acf.hhs.gov/state-of-colorado-interoperability-and-integration-project>

Activity	Tasks	Deliverable
<p>Create a Department Business Data Stewards Council to engage all divisions of the agency and formalize data stewardship activities and processes</p>	<ul style="list-style-type: none"> <li>• Identify business data stewards/ coordinators for DHS data</li> <li>• Create a common baseline of DHS-wide information: a DHS-wide foundation for data sharing, information discovery, future architectures</li> <li>• Open the Council to interagency communities of interest (COI) that have as their goal coordinating, exchanging, and improving the quality of health information and services available to citizens and constituents</li> </ul>	<p><i>Creation of Business Data Architects</i></p>
<p>Create Interoperability Advisory Council</p>	<ul style="list-style-type: none"> <li>• Begin working with OIT and other state agencies on the Proof of Concept (POC) initiatives</li> <li>• Begin developing communication plans and change management strategies</li> </ul>	<p><i>Creation of IAC, Formalize POC planning documents, Creation of Communication and Change Management Plans</i></p>

Meta Data Repository Work Stream

Metadata will be used as a utility source for information and knowledge management, development, and data discovery.

Activity	Tasks	Deliverable
Create an inventory of all information systems in DHS to develop a baseline of all DHS data and systems identified with the business function they support	<ul style="list-style-type: none"> <li>• Complete 'as-is' enterprise information architecture at the department and system level</li> </ul>	<i>Existing Systems Inventory</i>
Create an inventory of all significant data in DHS to have a baseline of all data assets	<ul style="list-style-type: none"> <li>• Complete 'as-is' enterprise information architecture at the data element level</li> </ul>	<i>Existing Data Inventory and Systems cross-reference</i>
<p>Establish and publish DHS data standards and definitions for all data elements</p> <p>Create DHS enterprise conceptual and logical models</p>	<ul style="list-style-type: none"> <li>• Purchase/confirm tool to contain information architecture</li> <li>• Validate Subject Area Model with agencies via data stewards Human Services Data Services Council (HSDSC)</li> <li>• Create Conceptual View of Enterprise Data Model with major data entities</li> <li>• Create Logical View of Enterprise Data Model with major data entity keys and attributes</li> </ul>	<i>Baseline for interoperability and data sharing decisions</i>
Data governance policies, processes and standards are established to manage the flow of data from capture to use	Cross Reference data in systems with National Information Exchange Model (NIEM) naming and model	<i>Create DHS Enterprise Data Models/Data Mappings</i>
Identify authoritative data sources for all data types		<i>Source data and systems of record</i>
Create and implement an enterprise data dictionary and taxonomy		<i>Common communication base</i>
Develop data solutions that serve multiagency business needs to facilitate organizational collaboration and partnership	<ul style="list-style-type: none"> <li>• Identify business data modelers for DHS</li> <li>• Identify projects with data sharing opportunities</li> </ul>	<i>DHS Data interoperability sharing opportunities</i>

Activity	Tasks	Deliverable
Develop a standard set of Metadata components required for DHS data elements	<ul style="list-style-type: none"> <li>• Create metadata component standard</li> <li>• Collect and document the metadata components for data elements</li> </ul>	<i>Implement Metadata Repository</i>
Master Data Management opportunities are identified across DHS to ensure the quality, reliability and integrity of the data	<ul style="list-style-type: none"> <li>• Identify DHS master data target areas</li> </ul>	<i>Interoperability data and systems efficiency targets</i>

Business Intelligence/Analytics – Work Stream

The Interoperability Implementation Roadmap provides a strategy to move forward with more sophisticated data reporting and business analytics capabilities. These capabilities provide a more unified and standardized methodology for business intelligence and analytics while reducing the manual efforts.

Activity	Tasks	Deliverable
Complete Business Intelligence (BI) Analysis and Purchase of BI Tool(s)	<ul style="list-style-type: none"> <li>• Complete purchases, installation</li> <li>• Training of team, staff on use of selected tool</li> </ul>	<i>Common set of tools with targeted purposes</i>
Proof of Concept for Business Tool(s)	<ul style="list-style-type: none"> <li>• Work with key resources to identify two to three key use cases/insights and develop a working dashboard. (Use Division for Developmental Disabilities DDD Web and bus data as part of proof of concept)</li> <li>• Develop dashboard/data visualization prototype</li> <li>• Review and document process, results</li> </ul>	<i>Tools Validated</i>
Evaluation of process and tools	<ul style="list-style-type: none"> <li>• Determine success of Proof of Concept and moving forward tasks</li> </ul>	<i>Basis for DHS wide reporting and dashboards established</i>
Monitor other BI efforts from other state agencies	<ul style="list-style-type: none"> <li>• Discuss with Secretary of State tools utilized for BI</li> <li>• Discuss with HCPF outcomes from BI RFP</li> </ul>	<i>Review tools available for BI and Analytics for statewide standardization and utilization</i>

Key Stakeholder Implementation – Work Stream

A key element of sustaining and embedding any innovation project is to communicate with key stakeholders effectively and to engage them as early on as possible with the project. Different stakeholders will have different needs and concerns – for instance, practitioners are more likely to want to know why they should adopt and prioritize the project (as opposed to other innovations), if there is good evidence to support its value, how it will benefit them, and the degree of support that they can expect from management.

Activity	Tasks	Deliverable
Internal Dissemination of Colorado Client Information Sharing System (CCISS) Implementation Plan – DHS Leadership - Leadership Dissemination/Overview and Acceptance	<ul style="list-style-type: none"> <li>• Detailed review of CCISS Implementation Plan by DHS EMT/Leadership</li> <li>• Review with CDHS Leadership /EMT after acceptance of Implementation Plan on methods of communication to agency staff, county directors and county staff</li> </ul>	<i>Agency-wide plan and agreement</i>
Initiate development of Communication/Change Management Work Group under Governance Structure		<i>Structure for change and remaining effective</i>
CCISS Interoperability Plan dissemination –external key stakeholders:	<ul style="list-style-type: none"> <li>• Establish where and how the implementation plan is made available (e.g. electronically, all hands meetings, town halls, newsletters, etc.)</li> <li>• Identify methodology for communicating the CCISS Interoperability Implementation Plan goals and objectives to external key stakeholders that will be impacted by DHS interoperability</li> </ul>	

Activity	Tasks	Deliverable
<p>Identify external partners such as: Colorado Department of Education (CDE), the Governor's Office of Information Technology (OIT), the Colorado Department of Health Care Policy and Financing (HCPF), State Judicial, Colorado Integrated Criminal Justice Information System (CICJIS), County Human Services Staff, Colorado Regional Health Information Organization (CORHIO), Health Information Exchange) HIE organizations, Connect for Health Colorado, others identified by Executive Planning Team (EPT)</p>		<p><i>Expanded sphere of effectiveness and influence defined</i></p>
<p>Develop and implement a process on how responses to the plan should be made, recorded, collated and use to further the key stakeholder initiative and include feedback into the overall strategy for implementation</p>		<p><i>Quality control and improvement processes established</i></p>

Business Process Improvement - Work Stream

The introduction of interoperability will require an examination of work flows and processes of the systems and offices that will be affected by the proposed new strategies and associated technologies. The successful execution of these strategies is dependent upon effective and efficient business processes. As each system is examined for inclusion into the interoperability environment, processes will be reviewed and analyzed to determine the level of impact on the business and functional side of the Department. As new tools and technology are introduced, it is imperative that a business process improvement analysis is conducted to ensure that all aspects of the business and operations are considered and included into a new future state solution before implementation of any new system or technology. The activities and tasks below in the business process work stream are high level tasks. A full plan will be developed by the IAC for business process improvement once the IAC has been initiated.

Activity	Tasks	Deliverable
Identify systems to be included in CCISS Interoperability	<ul style="list-style-type: none"> <li>• Review business processes associated with system including areas of improvement identified by DHS users and consumers of the system information</li> <li>• Conduct Business Process Improvement (BPI) analysis of systems and offices</li> <li>• Review with DHS Office Directors proposed business areas impacted by interoperability</li> </ul>	<i>Documented areas included in BPI strategy for interoperability</i>
Involvement of key stakeholders of systems	<ul style="list-style-type: none"> <li>• Review recommendations for BPI strategy</li> <li>• Develop strategy for 'future state' process</li> <li>• Train key stakeholders on future state process</li> </ul>	<i>Document BPI future state process</i>
Implement interoperability strategy/technology	<ul style="list-style-type: none"> <li>• Monitor new future state for possible failure points</li> <li>• Train on interoperability strategy/technology</li> </ul>	<i>Training and future state process documentation</i>

Change Management/Communication Work Stream

The Interoperability Advisory Council (IAC) will develop a Change Management plan that will address the organizational change management requirements for this part of the Roadmap. The change management component of the CCISS Interoperability Roadmap will address the ‘human side’ of the implementation strategy of interoperability. The overarching purpose of change management is to accelerate the speed at which people move successfully through the change process so that anticipated benefits are achieved faster. Through optimizing the efficiency and efficacy of users, an effective change management program will also:

- Improve organizational outcomes and performance.
- Enhance employee satisfaction, morale, and engagement.
- Improve service quality.

Activity	Tasks	Deliverable
Communication development for and Key Stakeholder Engagement (internal / external partners)	<ul style="list-style-type: none"> <li>• Meet with IAC to discuss methods of communication and priorities of Leadership.</li> <li>• Develop communication and messaging plan</li> </ul>	<i>Communication Plan</i>
Work with IAC to identify areas of change within the Interoperability Roadmap	<ul style="list-style-type: none"> <li>• Develop organizational change processes</li> <li>• Identity areas requiring training (Role based training)</li> <li>• Assist with process and procedure development</li> <li>• Training delivery planning</li> </ul>	<i>Training Plan; Process development Plan</i>
Develop Change Management / Communication materials	<ul style="list-style-type: none"> <li>• Develop newsletter; website</li> <li>• Review information from Key Stakeholder Engagement and develop communication materials for dissemination</li> <li>• Review feedback from key stakeholders – incorporate into communication and training materials</li> </ul>	<i>Communication materials; website; newsletter, press releases</i>

### **Alignment with OIT Best Practices:**

The Office of Information Technology (OIT) was an active participant in the planning grant. The implementation of Interoperability will be in cooperation with OIT and will align with their enterprise health IT architecture model. Interoperability will utilize and expand several OIT enterprise services to connect all of the Department's data systems to include, iData, Identity Resolution Information System, metadata repository, enterprise service bus, identity management, rules engine and professional consumer portal.

### **Security and Backup/Disaster Recovery:**

The system of interoperability will have redundant IT components and is designed to meet federal and State IT architecture, security and business continuity requirements. Interoperability and the associated systems will follow the State Cybersecurity Policies set forth by the Office of Information Security. Interoperability will follow the National Institute of Standards and Technology (NIST) 800-53 guidelines that focus on access management and identity management for implementing electronic authentication. NIST defines Identity Management or IDM as '*a process of establishing confidence in user identities that are electronically presented to an information system.*' CCISS Interoperability Roadmap is including the following in its IDM/EAM (Enterprise Architecture Management) framework:

- Centralized provisioning for user authentication,
- Centralized, local or remote authentication of users,
- Federated Single Sign-On that will allow a user's identity to be recognized by multiple systems.

### **Business Process Analysis:**

The Department's Office of Children, Youth and Families (OCYF), was the recipient of a planning grant from the Administration for Children and Families, Office of Child Support Enforcement. OCYF used this grant to create an actionable plan, titled "*Interoperability Roadmap*," to implement a sustainable, strategic pathway to 'connect' all of the internal systems, to make data and human services records available without removing the data from the source systems.

### **Systems Integration Opportunities:**

Interoperability, by design, is intended to integrate all of the Department's IT systems and is extensible to any other State agency's data systems. The funding requested is to integrate the Department's systems.

### **Program Plan:**

Please see the Implementation Plan section of this document.

### **Cost Benefit Analysis and Project Alternatives:**

The Department can continue to build custom interfaces to be developed at costs ranging from \$10,000 to \$80,000, depending on complexity. Industry standard annual maintenance costs for interfaces, of which the Department has over 500, are between \$15,000 and \$30,000 per year, and the Department is not funded to maintain its existing interfaces at this level.

### **Consequences if not funded:**

This is the second year of a 5 year project and if funding from the State for the 10% of the 90/10 match is not received in FY 2016-17 then there will be no federal match and the project will be terminated without achieving the stated objectives.

The Department's current practice significantly impedes the integration of services to improve outcomes and reduce costs. Without developing interoperability, the Department's IT systems will remain disconnected, and will continue to transfer data via legacy disparate interfaces, specifically:

- At the direct services level, a child welfare case worker, a mental health worker, a youth corrections worker, a school counselor, etc., will not have access to all appropriate client information in order to understand, coordinate, and/or provide services to children, youth and families.
- At the managerial level, supervisors will not have the necessary access to client information across systems to maximize effectiveness in providing guidance and recommendations to direct services staff and in analyzing the effectiveness of services.
- At the program administration and policy levels, county and state administrators will not have access to real-time and aggregate information across systems in order to be informed to make operational and strategic decisions regarding services and investments.
- By not maintaining, updating or monitoring the way the Department moves data appropriately, it is creating a risk for future failure or compromise. With 500 interfaces using 28 different methods in varying levels of maintenance, there are significant risks when dealing with highly sensitive personal, health, and financial information.

Currently, the Department is requesting funding that utilizes a 90/10 percent match funding model under the OMB Circular A-87 Cost Allocation Exception for implementing and maintaining an interoperable environment. The Department will request General Fund for 10% and federal funds for 90%. The expiration date of this funding split is currently December 31, 2015, with an extension through December 31, 2018.

### **Request for Proposal:**

The Department has defined deliverables as a part of our planning efforts and we will require service levels specific to this project with our vendor partners and OIT. Performance based contracts will be used with appropriate penalties.

While completing the federal approval process, The Department will complete a Request for Information (RFI) to solicit design, development and implementation information based upon the Interoperability Roadmap from the planning grant. This information and the Roadmap will be combined into one or more Request for Proposals (RFP) to procure a master implementation vendor and functional components.

### **Operating Budget Impact:**

There is no new operating fund request in FY 2016-17; the \$1,323,360 from FY 2015-16 will continue in the base for FY 2016-17. After the 5-year development and implementation, there will be an operational budget request to fund the ongoing support and maintenance of the environment at a 75/25 federal match. The amount will be determined based on on-going operational needs.

**Assumptions for Calculations:**

The full assumptions used to calculate this request can be found in the accompanying spreadsheets and in the Interoperability Roadmap. All personal services costs are based on contract consulting hourly rates.

Estimated Costs	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	Total Cost
Consulting Services	\$3,815,440	\$3,503,520	\$3,503,520	\$3,503,520	\$3,530,660	\$17,856,660
IV&V	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,000,000
Infrastructure	\$8,800,500	\$5,585,000	\$5,585,000	\$5,585,000	\$5,535,000	\$31,090,500
Agency	\$1,323,360	\$1,323,360	\$1,323,360	\$1,323,360	\$1,323,360	\$6,616,800
<b>Total Budget (Est)</b>	<b>\$14,139,300</b>	<b>\$10,611,880</b>	<b>\$10,611,880</b>	<b>\$10,611,880</b>	<b>\$10,589,020</b>	<b>\$56,563,960</b>
Federal Funding (90%)	\$12,725,370	\$9,550,692	\$9,550,692	\$9,550,692	\$9,530,118	\$50,907,564
State GF (10%) Match	\$1,413,930	\$1,061,188	\$1,061,188	\$1,061,188	\$1,058,902	\$5,656,396
<b>Total Budget (Est)</b>	<b>\$14,139,300</b>	<b>\$10,611,880</b>	<b>\$10,611,880</b>	<b>\$10,611,880</b>	<b>\$10,589,020</b>	<b>\$56,563,960</b>

**Cost Savings and Improved Performance Outcomes:**

The Department will be able to utilize interoperability to view clients across all data systems to align services for cost savings, fraud avoidance, and to reduce program administration costs.

The interfaces are disbursed across the Department's core IT systems. Based on industry standards, the cost to develop a custom interface is estimated to be approximately \$40,000, depending on complexity and type of protocol used for its development. This also includes the development of the infrastructure.

Industry standard development costs for batch service interfaces range from \$15,000 to \$30,000. Direct Access screen interfaces, with an estimated three to five screens per interface, is less expensive at \$7,000 – \$8,000 per interface. In addition, the expected costs of annual support and maintenance over a 5+ year life cycle for each interface is estimated to be between \$15,000 and \$30,000 per year, per interface, or a total of \$125,000 to \$200,000 each, again over a 5 year life cycle. The existing Department interface protocols break out as follows:

Type of Protocols	Number per Protocol
FTP (Secure FTP, SFTP, FTP with PGP, FTP)	172
Broker	126
Infomover	70
Mainframe	35
Direct Access	24
Web Services	23
Cyber fusion	20
Manual	11
All Others	29
ADABAS/IEBGENER/3270 Batch	11
<b>Total</b>	<b>520</b>

A proposed strategy of the CCISS project is to begin to replace some of the existing protocols such as Infomover and manual interfaces (a total of 81). Using the standard interface maintenance costs of \$15,000

to \$30,000 per year, and eliminating over 80 interfaces, there would be an initial immediate savings of \$2,430,000 in the first year. The Enterprise Service Bus (ESB) strategy would allow the Department to begin porting over its systems in a phased approach and allow for savings that would be re-invested in the overall enterprise architecture and interoperability plan. Over the five year implementation plan, the Department would show a savings of \$12,150,000 just on the replacement of the Infomover protocol and manual interfaces. As other interfaces are identified as enterprise service bus (ESB) ready and illustrated in Diagram 2, additional savings will be realized that would allow for additional cost benefit and savings to the Department. This analysis and present cost factoring will be validated during the first year of implementation and will be balanced with the potential cost allocation that is currently under exploration with the Department of Health Care Policy and Financing (HCPF) and the U.S. Department of Health and Human Services' Centers for Medicare and Medicaid Services (CMS).

**Return on Investment:**

The principle return on investment is in the improvement in the delivery of services to clients, efficiency of the workforce and being able to prove the effectiveness of services delivered. Specific areas include:

*Faster access to services.* Multiple, redundant intake and eligibility systems, spread across different agencies and locations, discourage individuals and families from seeking care. Similarly, the public must be able to easily identify and access community resources.

*Casework simplification.* Simplifying business and technical processes enable caseworkers to spend less time on data entry and manual reporting and more time with clients.

*Safety.* The demand for coordination is heightened when it can increase the safety of individuals, families and communities.

*Outcome measurements.* A global view of clients, services and resource distribution within and across departments and programs, provides meaningful metrics for measuring outcomes.

There is also the opportunity over the five-year implementation plan for the Department to save up to \$12,150,000 just on the replacement of the Infomover protocol and manual interfaces. Please refer to Cost Savings and Improved Performance Outcomes section for additional details.

<b>ESTIMATED PROJECT TIME TABLE (PENDING FEDERAL APPROVAL)</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
Implement Governance & Key Stakeholder Engagement	July 2015	<b>On Going</b>
Implement Meta Data Repository	July 2015	<b>June 2017</b>
Implement Identity Management, Security, Enterprise Service Bus	July 2015	<b>June 2017</b>
Integrate Data Systems into Interoperable Environment	July 2015	<b>June 2020</b>
Implement Professional Consumer Portal	July 2015	<b>June 2017</b>
Implement Business Intelligence / Analytics	July 2015	<b>June 2020</b>

<b>ADDITIONAL REQUEST INFORMATION</b>	
Please indicate if three-year roll forward spending authority is required.	<input checked="" type="checkbox"/> X Yes <input type="checkbox"/> No
Date of project's most recent Business Process Analysis:	January 31, 2014
Please provide the link to the Business Process Analysis or attached the first page of the analysis to this document:	<a href="http://www.acf.hhs.gov/state-of-colorado-interopability-and-integration-project">http://www.acf.hhs.gov/state-of-colorado-interopability-and-integration-project</a>
Request 6-month encumbrance waiver?	<input checked="" type="checkbox"/> X Yes <input type="checkbox"/> No
New construction or modification? N/A	<input type="checkbox"/> New <input type="checkbox"/> Renovation <input type="checkbox"/> Expansion <input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	N/A      ASF      GSF
Is this a continuation of a project appropriated in a prior year?	<input checked="" type="checkbox"/> X Yes      No
If this is a continuation project, what is the State Controller Project Number?	2016-013115

<b>CONTINUATION HISTORY</b>		
	FY 2015-16 Appropriated	Total Appropriations
Total Funds	14,139,300	14,139,300
General Fund	1,413,930	1,413,930
Cash Funds	0	0
Reappropriated	0	0
Federal Funds	12,725,370	12,725,370

**CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17**

Agency or Institution:	Human Services	Signature: Department or Institution Approval:	<i>Melissa Paulet</i> 9-29-15
Project Title:	Modernizing the Child Welfare Case Management System	Signature: CICHE Approval:	
Project Year(s):	FY 2015-16 to FY 2017-18	Signature: OIT Approval:	
Agency or Institution Priority Number:	1	Signature: OSPB Approval:	<i>Goetz</i> 10/1/15
Program Plan:	Name and e-mail address of preparer:		

Revision? Yes No	Total Project Costs	Total Prior Year Appropriations	Current Request FY 2016-17	Year 2 Request	Year 3 Request	Year 4 Request	Year 5 Request
(1) Land /Building Acquisition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(1) Consultants/Contractors	\$ 9,013,790	\$ 3,048,588	\$ 2,842,601	\$ 2,982,601	\$ -	\$ -	\$ -
(2) Quality Assurance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Independent Verification and Validation (I&V)	\$ 642,822	\$ -	\$ 321,411	\$ 321,411	\$ -	\$ -	\$ -
(4) Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5) Leased Space (Temporary)	\$ 250,000	\$ 100,000	\$ 75,000	\$ 75,000	\$ -	\$ -	\$ -
(6) Feasibility Study	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7a) Inflation for Professional Services	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(8) Other Services/Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(9) Total Professional Services	\$ 9,906,612	\$ 3,148,588	\$ 3,379,012	\$ 3,379,012	\$ -	\$ -	\$ -
(1) (a) New GSF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New \$ /GSF							
(b) Renovate GSF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Renovate \$ /GSF							
(3) Site Work/Landscaping	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Other (Specify)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5a) Inflation for Construction	\$ 1,080,000	\$ 551,000	\$ 264,500	\$ 264,500	\$ -	\$ -	\$ -
(5b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(6) Total Construction Costs	\$ 1,080,000	\$ 551,000	\$ 264,500	\$ 264,500	\$ -	\$ -	\$ -
(1) Software COTS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Software Built	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4a) Inflation on Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(5) Total Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(1) Servers	\$ -	\$ 2,800,000	\$ 2,800,000	\$ 2,800,000	\$ -	\$ -	\$ -
(2) PCs, Laptops, Terminals, PDAs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Printers, Scanners, Peripherals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Network Equipment/Cabling	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5) Other (Specify)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(6) Miscellaneous	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7) Total Equipment and Miscellaneous Costs	\$ 8,400,000	\$ 2,800,000	\$ 2,800,000	\$ 2,800,000	\$ -	\$ -	\$ -
(1) Maintenance Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Repair Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Staffing/Employee Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5) Total Operating Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Project Costs</b>	<b>\$ 18,346,612</b>	<b>\$ 6,499,588</b>	<b>\$ 6,443,512</b>	<b>\$ 6,443,512</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
(1) 5% for New	\$ 937,189	\$ 324,979	\$ 308,105	\$ 308,105	\$ -	\$ -	\$ -
(2) 10% for Renovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Total Contingency	\$ 937,189	\$ 324,979	\$ 308,105	\$ 308,105	\$ -	\$ -	\$ -
<b>Total Budget Request (F+G)(3)</b>	<b>\$ 20,323,801</b>	<b>\$ 6,824,567</b>	<b>\$ 6,749,617</b>	<b>\$ 6,749,617</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
GF \$	14,087,941	4,648,707	4,709,617	4,709,617	\$ -	\$ -	\$ -
CF \$	-	-	-	-	\$ -	\$ -	\$ -
RF \$	-	-	-	-	\$ -	\$ -	\$ -
FF \$	6,255,860	2,175,860	2,040,000	2,040,000	\$ -	\$ -	\$ -



**COLORADO**  
 Department of Human Services

John W. Hickenlooper  
 Governor

Reggie Bicha  
 Executive Director

FY 2016-17 IT Capital Construction Request | October 1, 2015

*Melissa W. [Signature]* 9.30.15  
 Signature Date

*Department of Human Services IT Capital Construction Priority: II-1  
 Phase 2: Modernizing the Child Welfare Case Management System*

Summary of IT Capital Construction Request	Total Funds	CCFE	Federal Funds
FY 2016-17	\$6,749,617	\$4,709,617	\$2,040,000
FY 2017-18	\$6,749,617	\$4,709,617	\$2,040,000

**Request Summary:**

The Department requests \$6,749,617 (\$4,709,617 General Fund and \$2,040,000 federal funds) in FY 2016-17 and FY 2017-18 to enhance and modernize Colorado's current Statewide Automated Child Welfare Information System (SACWIS) compliant case management system (Trails) and underlying infrastructure. This is Phase Two of a multi-phase approach. Funding will continue this 3-year Trails modernization project making it easier to use, maintain, and adjust to program needs and new initiatives implemented by the Department. The system will be designed to allow faster implementation of system modifications to better reflect changing child welfare practices.

Trails, the current case management system, needs to be modernized to make it easier to use, maintain, and adjust to program needs and new initiatives implemented by the Department. The Department received \$6,824,567 total funds in FY 2015-16 for the first year of funding.

**Project Description:**

The modernized system will be designed to allow faster implementation of system modifications to better reflect changing child welfare practices. The benefit of augmenting the existing system as opposed to developing a new system is that it leverages previous investments, work force familiarity, and existing working relationships with the Governor's Office of Information Technology (OIT). Colorado's automated case management system is a critical component to county child protection practice. Building upon the existing system minimizes the potential for service interruption.

This option utilizes a practice already employed by the State to modify and improve the current Trails system in order to meet the changing needs of its users and beneficiaries. Changes and extensions to the system have been supported for some time and the general consensus among stakeholders, management and users is that a more concerted, focused effort is required to enable better interfaces, reporting, and ultimately service outcomes. Critical needs that were identified include:

- Mobile device compatibility and support – the use of hand-held computing devices is pervasive. It is imperative to provide systems that can be used effectively on mobile devices in support of work functions, such as:
  - The ability to present data and provide input capabilities on mobile devices, and
  - The ability to work on mobile devices offline and upload content at a later time.
- Data integration – new and standardized data interfaces will help promote the effective use and availability of data across multiple systems that influence child welfare to improve overall case management and outcomes. This includes the ability to add unstructured or external data (e.g. photos or call recordings) to a case file.
- Profile driven capabilities – whether for data administration purposes or ease of use, providing interfaces appropriate to user roles (agency-specific and/or job function related) will help promote effective use of the system, minimize IT support demands and dependency and improve data quality and child welfare services.

Changes to the system will improve how counties perform case management. County departments of human/social services have indicated for several years they are understaffed when it comes to caseworkers. The Department received funding in the 2013 legislative session for the Office of the State Auditor (OSA) to perform a workload study. This workload study resulted in the funding of 100 FTEs for additional casework staff and a caseload study in FY 2015-16. Additionally, the Department received funding in FY 2014-15 to implement a central Hotline for child abuse and neglect reporting, which became operational in January 2015. Reports of suspected child abuse and neglect are expected to increase due to the Hotline, requiring additional staffing needs at the county level. Since January 2015, there have been 109,678 calls received by the Hotline. Information on each call recording is required to be entered into the Trails application for the Hotline. Of the total number of calls received, 45,407 calls were referrals of child abuse or neglect, which requires county staff time. Counties then needed to investigate 16,378 of those calls, as the remaining calls did not warrant an investigation. County staff already have a difficult time inputting information into Trails, even as the State has provided modifications and improvements. The nature of their work takes them many places besides the county office, including court, case residences, and twenty-four hour placement facilities. Being required to input a large amount of information into an antiquated system which is not easy to navigate makes it difficult to keep current on case management documentation. Updating the Trails system, coupled with improving mobile data capability, will allow greater flexibility and faster data input. The result will be a quicker assessment of data necessary to make the right case decisions at the right time leading to appropriate services and better outcomes for children involved with Child Welfare.

Trails is due for an upgrade, to make the system more efficient and effective. If the Department was unable to provide an upgrade to the case management system, there would still be navigation issues, mobility needs, and lack of data integration. Caseworkers in county human/social services offices will continue to experience difficulty moving within the system, and data input will remain time consuming. As the Department is implementing workforce tools and mobile technology to counties, modernizing Trails will improve flexibility in how caseworkers can conduct business in the field.

**Background and Justification:**

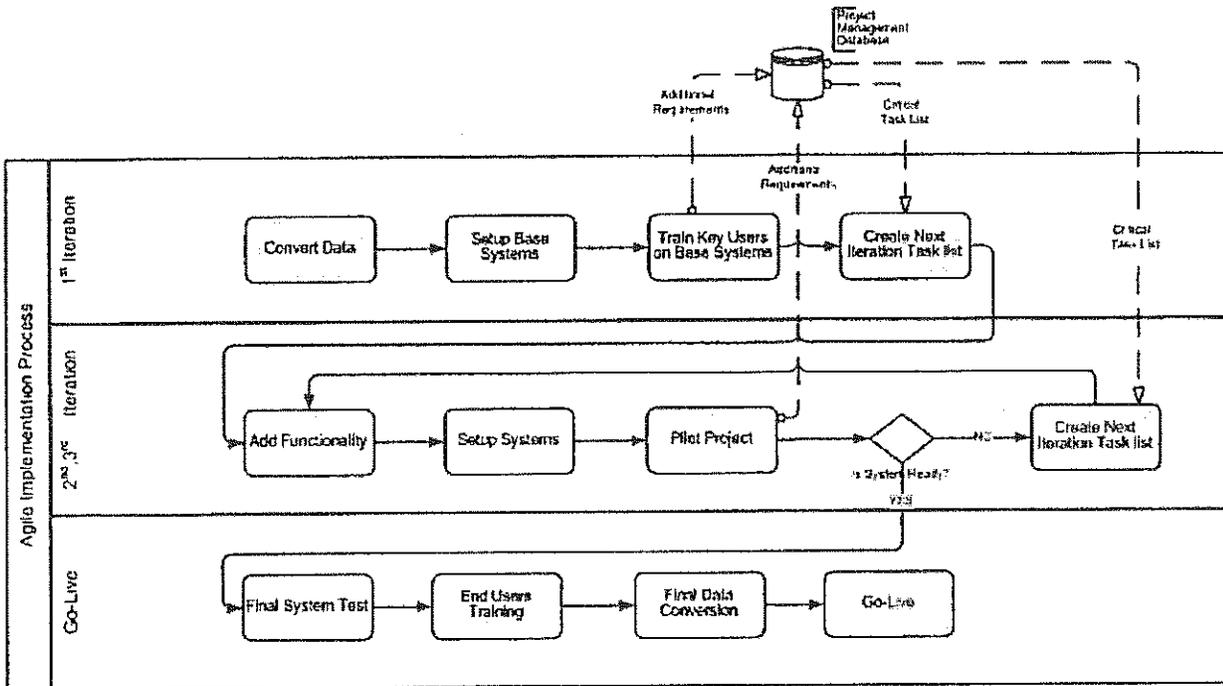
Colorado’s current Statewide Automated Child Welfare Information System (SACWIS), better known as Trails, has been in use for the past thirteen years. It is a complex and comprehensive system that has evolved over time since 2001, resulting in benefits and challenges to its continued use. Trails is a system purchased from New Hampshire and tailored to fit Colorado’s needs. There have been many changes over the years to Trails, as process changes occur and new requirements are identified. The system is used by

Child Welfare, Youth Corrections, Early Childhood, Administrative Review, the Office of Colorado's Child Protection Ombudsman, sixty-four county Departments of Human and Social Services, and certain contracted providers. It is the reporting system for several sets of federal requirements and has been SACWIS compliant since 2011. Additionally, Trails integrates with eleven other systems via eighty-seven unique interfaces within the Department and other state agencies. Internal and external stakeholders have identified limitations with the current system, including but not limited to, outdated system architecture, limited mobile system access, redundant data entry, missing data interfaces, data integrity, inability to augment case data with attachments, and ad hoc reporting capabilities. Users are required to enter the same information in more than one area, they have difficulty navigating a complex system, and the system has a slow response time due to a client-server based technology. Providing an upgrade to Trails will simplify Trails navigation, provide greater access to the system for the use of mobile technology, and improve accuracy and efficiency of services. This funding request addresses the current condition of the state child welfare case management system that is operating on an antiquated technology platform. To better serve the children and families in Colorado, counties need a system that functions effectively, maintains program integrity, and is easy to use.

The Department contracted with a vendor in FY 2013-14 for an independent analysis of Trails, which resulted in a recommendation to modernize the system. The budget request approved for FY 2015-16 was based on the recommendation and was included in a capital request. The changes to modernize the system will be achieved through technology upgrades and enhanced data interfaces. Some benefits include: a more modern, effective, and elegant interface that is easy to navigate and supports common data views and capabilities provided by other, similar systems; a more modern technology platform; greater reporting flexibility and data analytics capabilities; and greater system interoperability to facilitate data sharing and overall case management outcomes. Trails is critical to implementing the Governor's Child Welfare Plan "Keeping Kids Safe and Families Healthy 2.0" and supporting the daily operation of county departments and youth corrections. Advanced analytical capabilities and a quality case management system will allow child welfare agencies to track current and historical services across multiple programs leading to a more comprehensive view and understanding of the needs of Colorado children and a greater ability for the child welfare agencies to provide services. Modernizing Trails will result in greater efficiencies for the workforce and will allow caseworkers to make faster and better informed responses leading to improved safety and well-being of Colorado children.

**Implementation Plan:**

Following is a diagram of the implementation plan for this project. In the flow chart below, the first iteration represents the existing Trails application.



Agile/Iterative Continued Improvement focuses on providing incremental system releases with maximum value to the organization. We will continue to analyze business and propose improvements. An "Improvements Wish List" will be prioritized after each iteration and a new set of modifications will be scheduled and the project plan updated as needed. This process gradually transforms into a general support operation but the culture of continued improvement will help us optimize the system while reaching the goal of system modernization.

Iterations will be determined by considering both distinct and dependent business areas. Priorities will be documented within the Trails Project Management plan. Trails will work in conjunction with program business partners (stakeholders) to define the order of operations for design, development and implementation.

**Alignment with OIT Best Practices:**

The Department has worked with OIT to develop costs and plans for this system upgrade. OIT staff have reviewed the independent report, and have been in consultation with the Department throughout the development of the original request and Phase 1 development. All processes are in conformity with OIT best practices. The implementation of this project will be in cooperation with OIT and will align with their enterprise health IT architecture model. It will allow the Department and OIT to connect data systems and create a single, comprehensive view of clients, allowing for a more efficient and cost effective program delivery and connection with agencies and health information partners. The Department will also continue its partnership with OIT throughout the life of the project.

**Security and Backup/Disaster Recovery:**

The infrastructure for the Trails (SACWIS) application is hosted in the Federated Cloud environment. There are defined backup and disaster recovery plans in that environment. These plans will be amended to ensure compliance per the requirements of the SACWIS application.

The Backup & Recovery plan and controls associated will also be documented in the System Security Plan to be reviewed by the Chief Information Security Officer.

CenturyLink Federated Cloud is designed to provide immediate response and subsequent recovery from any unplanned computing services interruption such as loss of utility services, building evacuation, or a catastrophic event at the data centers.

**Business Process Analysis:**

The independent review included an analysis of methods used to conduct a thorough and comprehensive view of the current Trails system and potential replacement alternatives including:

- developing questionnaires for stakeholder and state interviews, and vendor responses;
- conducting stakeholder and state interviews;
- soliciting vendor information;
- establishing a repository of reference materials;
- analyzing relevant information; and
- developing evaluation tools.

This upgrade is intended to modernize the current automated case management system to make it more efficient.

**Systems Integration Opportunities:**

The current Trails system integrates with eleven (11) other systems through 87 unique interfaces within the Department and other state agencies. This upgrade will not change this interaction, but will enhance its capabilities.

**Program Plan:**

As mentioned earlier, the Department contracted with a vendor to conduct an analysis of Trails and present options for enhancement or replacement of the system.

The independent review included variables such as the system's history, diversity of stakeholders, varied organizational objectives, available alternative products, simultaneous Department technology-related initiatives, and limited resources.

Based on available information and understanding of Department goals in analyzing alternatives to replace and/or enhance Trails, the independent review recommended the Department pursue a technology upgrade and interface enhancement approach, rather than wholesale system replacement.

**Cost Benefit Analysis and Project Alternatives:**

Modernizing Trails was compared to several other options for consideration by the Department. One option was to leave the existing system alone and do nothing. This was not a feasible approach as evidenced by the problem statement outlined in the previous section of this funding request. The State could replace the Trails system, in its entirety, with a Commercial Off-The-Shelf (COTS) solution. The benefits to this

approach (based on modern interface paradigms and service-oriented, n-tier architecture; developed and supported by Subject Matter Experts; and greater business rule control) were outweighed by the risks (cost, time, degree of organizational change; customization required to match current Trails functionality; required data conversion at substantial cost and risk; and greater learning curve and training needs). Currently, the state has two-tier architecture of PowerBuilder on the front end and Oracle on the back end. Moving to n-tier architecture eliminates the need for client server technology, thus transitioning to a web-based application. According to the research done by the vendor, of the states that chose full replacement, Commercial-Off-The-Shelf (COTS) solutions costs ranged from \$26-\$45 million and annual operating costs (including personal services) between \$6-\$7 million. Of the states that are maintaining/enhancing an existing system, Wisconsin included an annual cost of \$4.3 million for vendor services. Washington, D.C. was able to convert a PowerBuilder-based system to .Net (which is one of the software languages used to develop web-based applications.) with interface enhancements and re-engineered code through a vendor contract for \$4.6 - \$5 million annually during their 18-month conversion.

**Consequences if not funded:**

Trails is due for an upgrade to make the system more efficient and effective. If the Department were not to provide an upgrade to the case management system, there will still be navigation issues, mobility needs, and lack of data integration. Caseworkers in county human and social services offices will continue to experience difficulty moving within the system, and data input will remain time consuming. If funding is not provided during years two and three of this project, the impact to ongoing operations may even be compounded. As the Department implemented workforce tools and mobile technology to counties, modernizing Trails will improve flexibility in how caseworkers can conduct business in the field and youth corrections provide detention and commitment.

**Request for Proposal:**

New development activities will be defined by a dedicated team of internal and contracted team members across a three-year time horizon. As part of Phase 1, the project team is undergoing a Request for Proposal process with vendors and plans to have a vendor selected in September 2015. This approach will be organized into phased, modular, incremental release cycles using an Agile methodology. There will be a contract development team located in OIT consisting of one Project Manager, one Independent Verification and Validation Specialist, one Technical Architect, one half-time Engagement/Integration Manager, eight Application Developers, four Business Analysts, and four Technical Analysts. These positions will be involved in the project for three years, starting in FY 2015-16, until the changes have been developed and implemented. This modernization project requires contract staff to assist with design and build activities. Once the new development is functional, the contract development team will no longer be needed. The State will still be required to maintain the current system and dedicate appropriate resources to maintenance and support.

**Operating Budget Impact:**

In addition to the contract team for OIT, the Division of Child Welfare requested, and received funding for in FY 2015-16, a Budget Analyst, a Data Programmer, and an Administrative Assistant. The operating cost of modernization includes adding twenty servers, with 16 GB Ram, 250 GB Disk, IIS8 and 4+ Core.

**Assumptions for Calculations:**

Table 1 outlines the costs for Phases 2 and 3 of this project, as well as FY 2015-16 costs as funded.

Table 1: FY 2016-17  
 Modernizing the Child Welfare Case Management System  
 Phase 2

Element	FY 2015-16	General Fund	Federal Fund	FY 2016-17 FY 2017-18	General Fund	Federal Fund
<b>Technology and Programming</b>						
Servers - configuration is dual core 250 GB, RAM 16GB	\$ 2,800,000	\$ 1,848,000	\$ 952,000	\$ 2,800,000	\$ 1,848,000	\$ 952,000
<b>Software</b>						
- Windows Server 2012 Standard	\$ 11,500	\$ 7,590	\$ 3,910	\$ -	\$ -	\$ -
- User CALS (licenses for concurrent users)	\$ 7,500	\$ 4,950	\$ 2,550	\$ -	\$ -	\$ -
<b>Developer Software</b>						
- TOAD licenses	\$ 10,800	\$ 7,128	\$ 3,672	\$ 10,800	\$ 7,128	\$ 3,672
- Visual Studio 2013	\$ 7,200	\$ 4,752	\$ 2,448	\$ 7,200	\$ 4,752	\$ 2,448
- Project Manager Software	\$ 750	\$ 495	\$ 255	\$ 750	\$ 495	\$ 255
- Developer/Technical Architect Software	\$ 750	\$ 495	\$ 255	\$ 750	\$ 495	\$ 255
Report Needs	\$ 292,500	\$ 193,050	\$ 99,450	\$ 45,000	\$ 29,700	\$ 15,300
Database Services	\$ 220,000	\$ 145,200	\$ 74,800	\$ 200,000	\$ 173,514	\$ 26,486
<b>Totals - Technology</b>	<b>\$ 3,351,000</b>	<b>\$ 2,211,660</b>	<b>\$ 1,139,340</b>	<b>\$ 3,064,500</b>	<b>\$ 2,064,084</b>	<b>\$ 1,000,416</b>
<b>Personal Services</b>						
<b>OIT Contracting</b>						
- Application Developers (8)	\$ 1,414,400	\$ 933,504	\$ 460,896	\$ 1,414,400	\$ 933,504	\$ 480,896
- Business Analysts (4)	\$ 540,800	\$ 356,928	\$ 183,872	\$ 540,800	\$ 356,928	\$ 183,872
- Technical Analysts (4)	\$ 540,800	\$ 356,928	\$ 183,872	\$ 540,800	\$ 356,928	\$ 183,872
- Project Manager (1)	\$ 187,200	\$ 123,552	\$ 63,648	\$ 187,200	\$ 123,552	\$ 63,648
- Technical Architect (1)	\$ 187,200	\$ 123,552	\$ 63,648	\$ 187,200	\$ 123,552	\$ 63,648
- Engagement/Integration Manager (1/2)	\$ 93,600	\$ 61,776	\$ 31,824	\$ 93,600	\$ 61,776	\$ 31,824
- PC's for contractors - Lease (19)	\$ 10,051	\$ 6,634	\$ 3,417	\$ 10,051	\$ 6,634	\$ 3,417
- Telephones for contractors (19)	\$ 8,550	\$ 5,643	\$ 2,907	\$ 8,550	\$ 5,643	\$ 2,907
- Office furniture for contractors one-time (19)	\$ 65,987	\$ 43,551	\$ 22,436	\$ -	\$ -	\$ -
Office Space (Empty building at FLMHC, per year \$3-\$4/sq ft)	\$ 100,000	\$ 100,000	\$ -	\$ 75,000	\$ 49,500	\$ 25,500
<b>Totals - Personal Services</b>	<b>\$ 3,148,588</b>	<b>\$ 2,112,068</b>	<b>\$ 1,036,520</b>	<b>\$ 3,057,601</b>	<b>\$ 2,018,017</b>	<b>\$ 1,039,584</b>
<b>Totals - Technology and Personal Services</b>	<b>\$ 6,499,588</b>	<b>\$ 4,323,728</b>	<b>\$ 2,175,860</b>	<b>\$ 6,122,101</b>	<b>\$ 4,082,101</b>	<b>\$ 2,040,000</b>
OIT Project Contingency - 5%	\$ 324,979	\$ 324,979	\$ -	\$ 306,105	\$ 306,105	\$ -
Subtotal				\$ 6,428,206	\$ 4,388,206	\$ 2,040,000
<b>IV&amp;V - Independent verification and validation</b>						
				\$ 321,411	\$ 321,411	
<b>Totals - Technology/Personal Services/Contingency/IV&amp;V</b>	<b>\$ 6,824,567</b>	<b>\$ 4,648,707</b>	<b>\$ 2,175,860</b>	<b>\$ 6,749,617</b>	<b>\$ 4,709,617</b>	<b>\$ 2,040,000</b>

Table 2 portrays the estimated time table for the project.

<b>Table 2: ESTIMATED PROJECT TIME TABLE</b>			
<b>Steps to be completed</b>	<b>Description</b>	<b>Start Date</b>	<b>Completion Date</b>
Project Management Planning and Activities	Initial project plan with high level requirements will be defined and revisited throughout the life cycle of this project.	07/01/2015	6/30/2018
Infrastructure setup	Infrastructure and security requirements will be defined and revisited throughout the life cycle of this project.	07/01/2015	03/31/2018
Business Requirement and Proposed Solution	This is the phase where business requirements are finalized, the software package is learned, and a solution using the package is defined to meet the business requirements.	07/01/2015	12/31/2015
High Level Design (Functional Specifications)	The planned solution is further clarified by functionally specifying how the system will operate.	10/1/2015	06/30/2016
Detailed Design (Design Specifications)	In this phase detailed design specifications are developed (e.g., table values are defined; specifications as to exactly how reports will look and work are developed, etc.).	01/01/2015	3/31/2018
System Configuration, Customization and Development	The system is "programmed" by setting up its parameters and tables with the values defined in the phases above. Interfaces, data conversion and customized programming are also done in this phase. Quality assurance (systems and user testing) is completed.	03/01/2016	01/31/2018
System Implementation	In this phase the system is implemented and operations are converted to the new system.	07/01/2016	06/30/2018

**Cost Savings and Improved Performance Outcomes:**

The modernization of Trails will provide savings in the form of development and maintenance costs for OIT, as well as anticipated workload efficiencies for caseworkers across the State.

The technology and current system architecture of the Trails system is over 20 years old and much of the underlying hardware and software is outdated and no longer supported by the manufacturers of the systems. As the platform itself is outdated there are few experienced programming resources available for development and maintenance in Trails. Experienced Powerbuilder programming resources are difficult to find and require better compensation of more than \$100 per hour for their services. In comparison, .NET programming resources are 30% less expensive to hire on average (\$70/hour). There are currently 12 development FTE on the Trails team and on average 3 additional OIT contractor resources each year. This equates to a total of 31,200 hours of programming resources annually. At current compensation levels, a 30% decrease in salary for 15 FTE could amount to \$936,000 in development savings annually. These potential savings would be realized in future years, after the new system is fully operational.

In addition, modernizing the technology is expected to reduce costs in other areas. While these costs have not yet been quantified it is expected that by bringing Trails interfaces onto one common technology platform, known as Enterprise Service Bus (ESB), for all Trails interfacing systems will reduce costs related to maintaining separate software and hardware licenses that are required to assist the disparate

systems from communicating effectively. This could effectively assist in OIT's vision of a statewide technology platform that is easier and cheaper to maintain and service.

The OSA workload study reported that 35% (16.1 hours each week) of a caseworker's time was devoted to documentation and administration, which includes documentation of required information in Trails (*Colorado Child Welfare County Workload Study, ICF International Inc., 2014*). In October 2014, a work group of State and County members was formed to develop recommendations based on the OSA workload study. One of the recommendations is quoted here:

"TRAILS is Colorado Child Welfare's automated case management system - Currently, TRAILS is outdated which makes it a difficult and cumbersome system for caseworkers to perform the data management element of their jobs. According to the study, TRAILS could be modernized to expand the system's capabilities. Modernizing the system would create workflow efficiencies for Colorado caseworkers through easier navigation and simplified reporting. This could include simplifying the capturing of data through document imaging technology, programming the system to automatically populate duplicative fields, and allowing remote access to the system through mobile devices."

While the work group did not specifically quantify how much time could be saved through modernization of the system, it is anticipated that ease of navigation through different modules, reducing duplicative data entry, and improving mobile access alone would free up caseworker time to devote effort towards directly serving the children, youth, and families of Colorado. Additionally, the proposed modernization efforts are expected to improve the quality of information collected by improving integration with external systems, improving data integrity through the use of more efficient business rules, and more timely (less reliant on notes or memory) data entry from caseworkers in the field. Accurate, timely data collection and quality of the data entered is paramount to improving the quality of service provided to the children, youth, and families of Colorado.

One suggested gain in worker efficiency could be realized by creating a dashboard for case workers to find pertinent information on all open cases within Trails. Currently, the Trails system is difficult to navigate and finding that one relevant contact, treatment plan, or case note can take a worker an estimated 10 to 15 minutes of navigating through the system to find. Modernizing Trails would create the flexibility within the systems architecture to develop caseworker and supervisor dashboards. These dashboards would need to be designed with feedback from County and State users to maximize efficiency, but with the right information at caseworker's fingertips the search time for the most relevant information could be reduced to less than a minute or two. Even a conservative estimate (reduction of 5 minutes per day per each of the over 1100 caseworkers) equates to over 90 hours in productivity gain per day across the child welfare system.

#### **Return on Investment:**

The principle return on investment is in the improvement in the delivery of services to clients, efficiency of the workforce and being able to prove the effectiveness of services delivered. Specific areas include:

*Faster access to services.* Multiple, redundant intake and eligibility systems, spread across different agencies and locations, discourage individuals and families from seeking care. Similarly, the public must be able to easily identify and access community resources.

*Casework simplification.* Simplifying business and technical processes enable caseworkers to spend less time on data entry and manual reporting and more time with clients.

*Safety.* The demand for coordination is heightened when it can increase the safety of individuals, families and communities.

*Outcome measurements.* A global view of clients, services and resource distribution within and across departments and programs, provides meaningful metrics for measuring outcomes.

<b>ADDITIONAL REQUEST INFORMATION</b>	
Please indicate if three-year roll forward spending authority is required.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Date of project's most recent Business Process Analysis:	
Please provide the link to the Business Process Analysis or attached the first page of the analysis to this document:	
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New <input type="checkbox"/> Renovation <input checked="" type="checkbox"/> Expansion <input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	ASF GSF
Is this a continuation of a project appropriated in a prior year?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?	

<b>CONTINUATION HISTORY (DELETE IF NOT APPLICABLE)</b>		
	<b>FY 2015-16 Appropriated</b>	<b>Total Appropriations</b>
<b>Total Funds</b>	\$6,824,567	\$6,824,567
<b>General Fund</b>	\$4,648,707	\$4,648,707
<b>Cash Funds*</b>	\$2,175,860	\$2,175,860
<b>Reappropriated / CFE</b>	\$0	\$0
<b>Federal Funds</b>	\$0	\$0

**CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17**

Agency or Institution	Colorado Department of Public Health and Environment	Signature Department or Institution Approval		Date																																																																																																																																																																																																																																																																																																																																																																																																																																		
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Project Year(s)	FY 2016 - 2018	Signature OIT Approval	<i>David B. Ziegler</i>	8-25-15																																																																																																																																																																																																																																																																																																																																																																																																																																		
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Program Plan	no	Christina McGroarty christina.mcgroarty@state.co.us	<i>Christina McGroarty</i>	10/1/15																																																																																																																																																																																																																																																																																																																																																																																																																																		
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(1) Software COTS	\$ 379,541	\$ -	\$ 358,966	\$ 20,575	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(2) Software Built	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(4a) Inflation on Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(4b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%																																																																																																																																																																																																																																																																																																																																																																																																																														
(6) Total Software	\$ 379,541	\$ -	\$ 358,966	\$ 20,575	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(1) Servers	\$ 14,754	\$ -	\$ 14,754	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(2) PCs, Laptops, Terminals, PDAs	\$ 5,600	\$ -	\$ 5,600	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(3) Printers, Scanners, Peripherals	\$ 9,487	\$ -	\$ 9,487	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(4) Network Equipment/Cabling	\$ 14,720	\$ -	\$ 14,720	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(5) Monitors (to see sample / worksheets)	\$ 6,784	\$ -	\$ 6,784	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(6) Miscellaneous	\$ 4,500	\$ -	\$ 4,500	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(7) Total Equipment and Miscellaneous Costs	\$ 55,845	\$ -	\$ 55,845	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(1) Maintenance Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(2) Repair Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(3) Staffing/Employee Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(4) Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(6) Total Operating Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
Total Project Costs	\$ 577,851	\$ -	\$ 491,402	\$ 86,449	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(1) 5% for New	\$ 28,893	\$ -	\$ 24,570	\$ 4,322	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(2) 10% for Renovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
(3) Total Contingency	\$ 28,893	\$ -	\$ 24,570	\$ 4,322	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
Total Budget Request (F+G(3))	\$ 606,744	\$ -	\$ 515,972	\$ 90,771	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
GF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
CH	\$ 214,016	\$ -	\$ 192,119	\$ 21,897	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														
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FF	\$ 392,727	\$ -	\$ 323,853	\$ 68,874	\$ -	\$ -	\$ -	\$ -																																																																																																																																																																																																																																																																																																																																																																																																																														



# COLORADO

## Department of Public Health and Environment

John W. Hickenlooper  
Governor

Dr. Larry Wolk  
Executive Director

FY 2016-17 Capital IT Request | October 1, 2015

  
Signature

9-30-15  
Date

**Department or CCHE Capital Construction Priority: 01  
Laboratory Information System – Colorado Public Health and Environment State Laboratory**

Summary of Capital Construction Request	Total Funds	Cash Funds*	Federal Funds
FY 2016-17	\$515,972	\$192,119	\$323,853
FY 2017-18	\$90,771	\$21,897	\$68,874

### Request Summary:

The Department of Public Health and Environment is requesting \$515,972 total funds including \$192,119 from the laboratory cash fund in FY 2016-17 and \$90,771 total funds including \$21,897 cash funds in FY 2017-18 to purchase and off-the-shelf Laboratory Information Management System. Since 2003, the Colorado Department of Public Health and Environment (CDPHE) Laboratory Services Division (LSD) has been using a Laboratory Information Tracking System (LITS) to track end-to-end laboratory data, processing, and reporting. The system has become outdated and unable to fulfill the needs of the laboratory and its customers. The LSD will issue an RFP for this project. Ongoing support will likely be \$60,000 annually, but will be funded within the Department’s existing system maintenance funding.

### Project Description:

The scope of this project requires purchasing Laboratory Information Management System (LIMS) software and support from an outside vendor. The system will be an off-the-shelf product and requirements will include HIPAA compliant electronic reporting, electronic billing capabilities, electronic test requisitions/requests, and ability to interface with laboratory instrumentation, chain of custody tracking, workflow assessment, Quality Assurance (QA) capabilities, inventory maintenance, and data analysis functionality. The current LITS system will be maintained strictly for data retention purposes until retention schedules expire. Infrastructure is primarily going to be servers in addition to scanning hardware and various networking equipment to transfer data. New servers will need to be procured as the current servers will need to continue to maintain the legacy LITS+ system for validation of the new system as well as queries to testing, billing and customer information. Solutions hosted by outside vendors will also be considered in the bid evaluation process. This project builds on the department’s (CDPHE) objective to get quality data into the CDPHE Data Repository and to the Centers for Disease Control (CDC). The need to update this system is so critical that the CDC has offered to pay for the cost associated with updating the data transfers from the old LITS system to the LIMS system when the new system is procured. The system will also build on the existing environment by providing direct uploading of laboratory result and quality control (QC) data from laboratory instruments replacing manual entry, staff created excel macros, and paper records. It will also expand data messaging capabilities for all data types to all capable recipients (LIMS, PHILP, HL7, SQL, external/internal customer needs), supply a web-based portal for data

exchange, reduce the risk of human error by minimizing the need for manual data entry, provide HIPAA and ISO 17025 compliant chain of custody, sample management, and electronic reporting, streamline laboratory data workflows, expand query capabilities and create standardized reports, provide data trending and tracking of specific metrics with statistical analysis of routine data collection and control charts, update supply inventories by monitoring testing work lists, interface with LSD's billing system and provide customer auto-pay and accounting e-billing capabilities.

### **Background and Justification:**

Though the current LITS system is functional, the LSD as well as other divisions within CDPHE (Water Quality, Hazardous Materials, and Disease Control, Center for Health and Environmental Data, and Air Quality) also have a need for cleaner and higher quality data. The current system is also unable to reconcile billings and collected revenue to the states accounting system. A new system would also have a high impact on both internal (CDPHE divisions) and external customers (paying residents and federal grant funding). A new system would allow the Lab to perform business functions, maintain integrity of data, tracking and reconciliation of revenue and the ability to obtain required regulatory certification.

An external analysis was done by contacting other state laboratories to identify if they were still using the free CDC issued LITS+ system. Colorado is one of the last labs to be using this outdated and restricting technology. Other labs have moved to web based off the shelf, configurable software specific to laboratories.

### **Implementation Plan**

The project will follow OIT direction and a PMP certified OIT project manager will be assigned. There will be software cycle requirement analysis, RFP drafting, review and development, RFP evaluation. Scope drafting and RFP evaluation will include review by multiple subject matter experts in all applicable professions (OIT, chemistry, microbiology, fiscal, security, accessioning and representatives from CDPHE divisions such as Water Quality, Air Quality, Hazardous Materials and Disease Control Division). Change management will be part of the RFP requirements as the awarded vendor will be responsible for providing training materials as well as on-site training. The Laboratory Information System Project has gone through Gate 1 of the OIT governance process on Monday June 29th and has received approval to move forward. As this project progresses, the Program will complete the project planning documentation and next steps in the gating process as dictated by the OIT project governance process.

### **Alignment with OIT Best Practices**

This request aligns with best practices in a variety of ways. Updated software will allow OIT to support the system that aligns with current programming languages and messaging standards. It will also be built on current platforms, which will decrease technical debt. Additionally, if the system selected through the RFP process is web based and vendor hosted, the project will align with OIT's Cloud First Initiative.

Furthermore, the replacement of the current legacy LITS+ system will prevent and/or eliminate redundant applications. Currently, LITS+ needs to be copied daily and is transformed in the Integrated Data Repository (IDR). This occurs because of the limited reporting functionality of LITS+.

The LITS+ system is unsupported which makes the lab vulnerable. LSD implemented the LITS+ information management system in 2001. Outside vendor support for the system was lost in 2003. Since then the system has been supported internally with the assistance of a single consultant without any significant updates. LSD requires a LIMS system with firm vendor support which will allow future updates.

The current LITS+ system does not meet OIT or industry standards. In the last 14 years the requirements for a functional laboratory information system have evolved. Electronic messaging standards have been adopted by LSD's stakeholders for secure data exchange. Laboratory quality assurance standards now require functionality beyond the capability of LITS.

The primary deficiency of the LITS+ system is the lack of data exchange functionality. All specimen and customer information is manually entered into the system from paper records. Data produced by laboratory instruments must be manually transcribed into LITS+. The vast majority of sample results are reported on paper records. The structure of the LITS+ database prohibits elegant and secure access to information by other state agencies.

The OIT business strategy focuses on information security, providing a customer-oriented business strategy, and inter-agency data exchange. LITS+ does not have the functionality for LSD to meet these goals. An ideal LIMS system will utilize industry data messaging standards to securely exchange data bi-directionally between LSD and its stakeholders while adhering to OIT information security policies. The new system will provide a web-based interface for private citizens and organizations to efficiently order testing and receive laboratory results. Such a system will improve internal workflow to minimize redundancies, reduce human error, and provide the analytical capabilities necessary to identify processes with potential for improving efficiency and reducing errors. Without these functionalities, LSD will continue to have deficient regulatory audit findings, not meet industry standards, fail to meet the needs of its customers, and isolate necessary information from other state agencies.

Finally, the replacement of the LITS+ system is consistent with the following Department strategic goals and objectives.

1. Promote Programmatic Excellence (Data driven strategies, Meet Regulatory and Statutory Requirements, Keep Up with the Speed of Business)
2. Create a More Efficient, Effective, Customer Oriented Department (Deliver Excellent Customer Service, Employ Lean Methodologies to Improve Business Processes (Use New and Alternate Technologies to Optimize Employee Performance))

### **Security and Backup/Disaster Recovery**

Current disaster recovery is a nightly backup process. Backups are stored offsite. The current LITS system has little security however it is an internal application so it is inherently more secure. Employee logins have no system or login policy.

The new system will have a similar backup / disaster recovery process, however it is not known at this time if this service will be handled by state OIT staff or a contractor. A new system would have a system and login policy.

### **Business Process Analysis**

The CDPHE Laboratory Services Division is currently working with the Governor's OIT office and has been working with an OIT business analyst in regards to all system requirements and business processes that are not laboratory specific. This project has received approval from CDPHE's Business Technology Team (BTT) and Executive Leadership Team (ELT). A vision and scope document has been submitted to the OIT gating committee.

LSD is performing an internal assessment of all laboratory specific processes that currently or will interface with a LIMS system in the future. While evaluating each process, representatives from each department within the division are determining the specific needs of the LIMS interface and how fulfillment of these needs will improve the status quo. Findings are routinely discussed with LSD management. The results of

this assessment will be the basis for the requirements written into the RFP. Metrics for evaluating response to the requirements are being determined concurrently. After completion of the assessment, the requirements of the system will be prioritized using a numeric scale based on their expected improvement in the quality of laboratory data being produced, benefit to division stakeholders, and the amount of data that will be impacted.

### **Systems Integration Opportunities**

The new system will utilize the HL7 data messaging standard to securely share clinical data with internal and external stakeholders such as local health care providers and federal agencies. Improvements in data storage structure will allow improved access by internal and external stakeholders to data of minimal to low sensitivity. Furthermore the new system will continue to export data to the IDR / CDC. "Real time" data export capabilities will be highly likely.

### **Program Plan**

Since this project is less than \$2 million, a program plan has not been included. The LIMS procurement process has been broken down into two separate OIT projects. The first medium sized project is drafting the RFP, the bidding process, and vendor selection. The RFP is expected to be released in early 2016 with approval by the Joint Technology Committee (JTC). Vendor selection will be performed by a committee, operating in conjunction with CDPHE's procurement office to ensure a complete and fair review. The selection committee will review and score each proposal submitted based on the criteria determined during the business process analysis. The top three proposals may be presented to the committee before final selection. Once the selection is made, the first project will be completed. If the legislature approves the request, vendor selection is expected to be completed by the end of FY 2015-16.

Design and implementation of the selected LIMS system will be a second OIT project and will begin once a contract has been signed and the vendor is ready to begin. Due to the size and scope of the project, a PMP certified OIT project manager will be utilized to assure timely completion and fulfillment of the contract. Executive Governance Committee (EGC) oversight and Independent Verification and Validation (IV&V) will most likely be required. At this point, the length of time and total cost of design and implementation is unknown, but will fit within the budgetary timeline outlined elsewhere in this document.

Once the LIMS system is operable, LSD will conduct an internal validation process to compare the reliability of specimen data handling and operability with the current LITS+ system. The LITS+ relies exclusively on paper records for data submission and primarily on paper records for reporting. Two thousand specimens will be run in parallel on both systems. LSD will collaborate with submitting agencies to compare the accuracy of information exchanged electronically to current paper methods. The evaluation will be considered successful if records are exchanged with the same or greater percent accuracy as LITS+. LITS+ does not include any of the workflow management, Quality Assurance (QA), billing, or instrument integration capabilities anticipated in the replacement LIMS system. Evaluation of these processes will be done indirectly through evaluation of the number of corrections needed, processing time of laboratory samples and number of samples billed during the trial period. Any shortfalls found will be followed up with the vendor.

### **Cost Savings and Improved Performance Outcomes**

Though cost savings is not the primary motivation for this initiative it will save money in the long run. A service agreement / support for the LIMS system is estimated to cost approximately \$60,000 annually. Currently the LSD pays a 3rd party contractor (the original programmer who worked for the CDC) between

\$20,000 and \$48,000 per year to maintain the system. This cost will be eliminated and used for support for the new system and applicable service agreements as needed.

Additionally 1.5 OIT FTE who currently support LITS+ and approximately \$187,000 will be saved by the department once the LITS+ system is eventually taken off-line. This savings will accrue to the Payments to OIT line in the Administration and Support Division.

#### **Cost-Benefit Analysis and Project Alternatives**

LSD's cost saving associated with implementation of a modern LIMS system are primarily expected to be attained through improved consolidation of resources, better alignment of staff work expectations, and consolidation of current software systems.

The limitation of the current LITS system has led to the need for multiple ancillary software packages to perform functions that will be consolidated in a new system. In addition to specimen tracking using the LITS+ system, LSD employees use separate software packages for chemical inventory, supply inventory, sample repository tracking, and sample reporting, all of which will be included in a new LIMS system. In addition to the license fees for each of these packages, support costs of these systems by on site OIT staff will be eliminated.

Improved data handling capabilities are expected to better align staff work with position expectations by eliminating redundancies, minimizing manual data entry, and time spent dealing with error related problems. Currently all data entry must be done manually and is performed by laboratory assistant staff. Scientific staff are responsible for reconciling samples with recorded data. Scientific staff are also responsible for reporting data either verbally, by fax, or in some cases by post. A new LIMS system will utilize electronic messaging for the majority of data transmission. This will free up laboratory assistant staff for reconciling samples with received data. The cost benefits of doing this are two-fold. First, by shifting sample reconciliation to assistant staff, scientific staff will be able to focus on laboratory testing and duties more appropriate for their position descriptions. Secondly, up front quality control of data will reduce costly downstream errors which cost staff time and laboratory resources. Electronic messaging will also reduce the burden of reporting on scientific staff, allowing them to focus on meeting growing grant expectations.

Consolidation of resources is also an expected cost benefit. Currently laboratory supplies, reagents, and samples stored throughout the department and inventories are maintained by individual work units. This results in redundant ordering of supplies. The current LITS system is outdated and has been customized / configured beyond its initial purpose. At this point it cannot be upgraded and maintaining the system is becoming higher risk as all the systems that support it continue to advance while LITS cannot. Both CDPHE and OIT feel that the only alternative is to procure a new off the shelf system that can be configured to the needs of the Colorado State Public Health Laboratory. New systems are web based and can be upgraded to extend the useful life of the system.

Electronic reporting and billing allows reconciliation with the CORE accounting system (allowing lost revenues to be recognized and billed). Customers will also be able to log in and submit samples as well as review statements of account on-line.

#### **Consequences if not funded:**

Failure to fund the LIMS project would have a high, negative impact on customers (internal divisions and external customers) and on internal users. Consequences include the inability to perform business functions, inability to maintain integrity of data, low image and functionality of Colorado laboratory

services, loss of revenue due to inability to provide electronic reporting and billing, inability to obtain required regulatory certification, risk of unsupported IT infrastructure/software and risk of CDPHE divisions having to contract with external labs which ultimately will cost them more.

**Operating Budget Impact:**

This request will not impact the operating budget. The program projects that the on-going operating and maintenance costs for the new LIMS system are estimated to be approximately \$60,000 per year. This estimate is based on 10% of the costs to develop the system. The labs existing annual operating appropriation should be able to sustain these maintenance costs from savings associated with maintaining the current system. The RFP will address ongoing system upgrades / new versions so the system does not need to be replaced in 5 years.

**Assumptions for Calculations:**

- Capital Purchase for LIMS software and implementation \$379,541.00
- Estimated expenditures for land purchases; \$0.00
- Estimated expenditures for professional services; \$142,465.00
- Estimated expenditures for construction; \$0.00
- A list of equipment and furnishings, including estimated prices; \$55,845.00
- Calculations for art in public places, as necessary; \$0.00
- Inflation assumptions by year and component; \$0.00
- A discussion of costs associated with High Performance Certification Program (HPCP), or LEED certification, and the target certification level. If HPCP certification will not be pursued, please provide an explanation as to why the project is exempt from this requirement; and \$0.00

This is an information technology project therefore the land, construction, building and art items do not apply. The professional services dollars are for a half time OIT project manager and independent verification and validation. Equipment costs are for servers, peripheral devices and other necessary equipment. Please note the system may be a hosted solution in which case servers may not be necessary. Costs are estimates based on preliminary research of likely systems. The program did not believe inflation would significantly impact the project, thus did not ask for inflation costs.

ADDITIONAL REQUEST INFORMATION			
Please indicate if three-year roll forward spending authority is required.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Date of project's most recent program plan:	Current 6/2015		
Please provide the link to the program plan or attached the first page of the analysis to this document:	Attached		
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
New construction or modification?	<input checked="" type="checkbox"/> New	<input type="checkbox"/> Renovation	
	<input type="checkbox"/> Expansion	<input type="checkbox"/> Capital Renewal	
Total Estimated Square Footage	N/A	ASF	N/A GSF
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
If this is a continuation project, what is the State	N/A		

Controller Project Number?				
	FY 2XXX-XX Appropriated	FY 2XXX-XX Appropriated	FY 2XXX-XX Appropriated	<b>Total Appropriations</b>
<b>Total Funds</b>	0	0	0	<b>0</b>
<b>General Fund</b>	0	0	0	<b>00</b>
<b>Cash Funds*</b>	0	0	0	<b>0</b>
<b>Reappropriated / CFE</b>	0	0	0	<b>0</b>
<b>Federal Funds</b>	0	0	0	<b>0</b>

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
OIT / Gate 1 / Approval Stages	4/2015	9/2015
Scope review and development / bid posting / review / evaluation	9/2015	3/2016
Vendor selection and contract negotiation	3/2016	6/2016
System Configuration	7/2016	7/2017
Ongoing maintenance	7/2017	Ongoing

<b>CASH FUND PROJECTIONS</b>			
Cash Fund name and number:		26A0 – Laboratory Cash Fund	
Statutory reference to Cash Fund:		C.R.S. 25-1.5-101	
Describe how revenue accrues to the fund:		Cash collected from fees charged for lab testing performed	
Describe any changes in revenue collections that will be necessary to fund this project:		Next year lab testing fees will need to be reviewed and possibly increased. This is normal operating procedure for the laboratory.	
If this project is being financed, describe the terms of the bond, including the length of the bond, the expected interest rate, when the agency plans to go to market, and the expected average annual payment (delete row if unnecessary):		N/A	
<b>FY 2014-15 Actual Ending Fund Balance</b>	<b>FY 2015-16 Projected Ending Fund Balance</b>	<b>FY 2016-17 Projected Ending Fund Balance with Project Approval</b>	<b>FY 2017-18 Projected Ending Fund Balance with Project Approval</b>
\$463,789 0	\$278,052	\$288,750	\$254,874

**CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17**

Agency or Institution:	Governor's Office of Information Technology		Signature:	David B. Zang				
Project Title:	Public Safety Communications Network (PSCN) Microwave Infrastructure Replacement		Department or Institution Approval:	Date 9-30-15				
Project Year(s):	FY 2016 -2020		Signature:	David B. Zang				
Agency or Institution Priority Number:	1		CCHE Approval:	Date				
Program Plan:			Signature:	David B. Zang				
			OIT Approval:	Date 9-30-15				
			Signature:	Michael Marsala				
			OSP Approval:	Date 10/1/15				
			Name and e-mail address of preparer:	Michael Marsala, michael.marsala@state.co.us				
Revision? Yes	Total Project Costs	Total Prior Year Appropriations	Current Request FY 2016-17	Year 2 Request	Year 3 Request	Year 4 Request	Year 5 Request	
<b>A. Land Acquisition</b>								
(1) Land/Building Acquisition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
<b>B. Contract Professional Services</b>								
(1) Consultants/Contractors	\$ 15,877,350	\$ 3,175,470	\$ 3,175,470	\$ 3,175,470	\$ 3,175,470	\$ 3,175,470	\$ 3,175,470	
(2) Quality Assurance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(3) Independent Verification and Validation (IV&V)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4) Training	\$ 269,000	\$ 53,800	\$ 53,800	\$ 53,800	\$ 53,800	\$ 53,800	\$ 53,800	
(5) Leased Space (Temporary)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(6) Feasibility Study	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(7a) Inflation for Professional Services	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(7b) Inflation Percentage Applied	\$ -	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
(8) Other Services/Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(9) Total Professional Services	\$ 16,146,350	\$ 3,229,270	\$ 3,229,270	\$ 3,229,270	\$ 3,229,270	\$ 3,229,270	\$ 3,229,270	
<b>C. Associated Building Construction</b>								
(1) (a) New (GSF): Tower Site Construction	\$ 4,500,000	\$ 900,000	\$ 900,000	\$ 900,000	\$ 900,000	\$ 900,000	\$ 900,000	
New \$ /GSF								
(b) Renovate GSF:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) Renovate \$ /GSF								
(3) Site Work/Landscaping	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4) Other (Specify): Local Government Expansion	\$ 185,600	\$ 37,120	\$ 37,120	\$ 37,120	\$ 37,120	\$ 37,120	\$ 37,120	
(5a) Inflation for Construction	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(5b) Inflation Percentage Applied	\$ -	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
(6) Total Construction Costs	\$ 4,685,600	\$ 937,120	\$ 937,120	\$ 937,120	\$ 937,120	\$ 937,120	\$ 937,120	
<b>D. Software Acquisition</b>								
(1) Software COTS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) Software Built	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4a) Inflation on Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4b) Inflation Percentage Applied	\$ -	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
(5) Total Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
<b>E. Equipment</b>								
(1) Network Management System	\$ 200,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	
(2) Microwave Radio Equipment	\$ 18,639,700	\$ 3,727,940	\$ 3,727,940	\$ 3,727,940	\$ 3,727,940	\$ 3,727,940	\$ 3,727,940	
(3) Battery Equipment	\$ 3,291,000	\$ 658,200	\$ 658,200	\$ 658,200	\$ 658,200	\$ 658,200	\$ 658,200	
(4) Ancillary Equipment	\$ 4,674,500	\$ 934,900	\$ 934,900	\$ 934,900	\$ 934,900	\$ 934,900	\$ 934,900	
(5) Spare Equipment	\$ 2,685,800	\$ 537,160	\$ 537,160	\$ 537,160	\$ 537,160	\$ 537,160	\$ 537,160	
(6) Miscellaneous: Test Equipment	\$ 537,500	\$ 107,500	\$ 107,500	\$ 107,500	\$ 107,500	\$ 107,500	\$ 107,500	
(7) Total Equipment and Miscellaneous Costs	\$ 30,078,500	\$ 6,015,700	\$ 6,015,700	\$ 6,015,700	\$ 6,015,700	\$ 6,015,700	\$ 6,015,700	
<b>F. Operating Cost</b>								
(1) Maintenance Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) Repair Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(3) Staffing/Employee Costs	\$ 4,344,312	\$ 834,664	\$ 877,412	\$ 877,412	\$ 877,412	\$ 877,412	\$ 877,412	
(4) Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(5) Total Operating Costs	\$ 4,344,312	\$ 834,664	\$ 877,412	\$ 877,412	\$ 877,412	\$ 877,412	\$ 877,412	
(6) Total Project Costs	\$ 55,254,762	\$ 11,016,754	\$ 11,059,502	\$ 11,059,502	\$ 11,059,502	\$ 11,059,502	\$ 11,059,502	
<b>G. Project Contingency</b>								
(1) 5% for New	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) 10% for Renovation	\$ 671,410	\$ 134,282	\$ 134,282	\$ 134,282	\$ 134,282	\$ 134,282	\$ 134,282	
(3) Total Contingency	\$ 671,410	\$ 134,282	\$ 134,282	\$ 134,282	\$ 134,282	\$ 134,282	\$ 134,282	
Total Budget Request [F+G(3)]	\$ 55,926,172	\$ 11,151,036	\$ 11,193,784	\$ 11,193,784	\$ 11,193,784	\$ 11,193,784	\$ 11,193,784	
<b>H. Source of Funds</b>								
GF	\$ 55,926,172	\$ 11,151,036	\$ 11,193,784	\$ 11,193,784	\$ 11,193,784	\$ 11,193,784	\$ 11,193,784	
CF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
RF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
FF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

check (should = 0)

\$55,926,172

\$11,151,036

\$11,193,784

\$11,193,784

\$11,193,784

\$11,193,784

\$0



# COLORADO

## The Office of Information Technology

John W. Hickenlooper  
Governor

Suma Nallapati  
Chief Information Officer

FY 2016-17 IT Capital Construction Request | October 1, 2015

*David B. King*  
Signature

9-30-2015  
Date

**Office of Information Technology Capital Construction Priority: 1  
Public Safety Communications Network (PSCN) Microwave Infrastructure Replacement**

Summary of Capital Construction Request	Total Funds	General Funds	Cash Funds*	Federal Funds
FY 2016-17	\$11,193,784	\$11,193,784	\$0	\$0
FY 2017-18	\$11,193,784	\$11,193,784	\$0	\$0
FY 2018-19	\$11,193,784	\$11,193,784	\$0	\$0
FY 2019-20	\$11,193,784	\$11,193,784	\$0	\$0

### Request Summary:

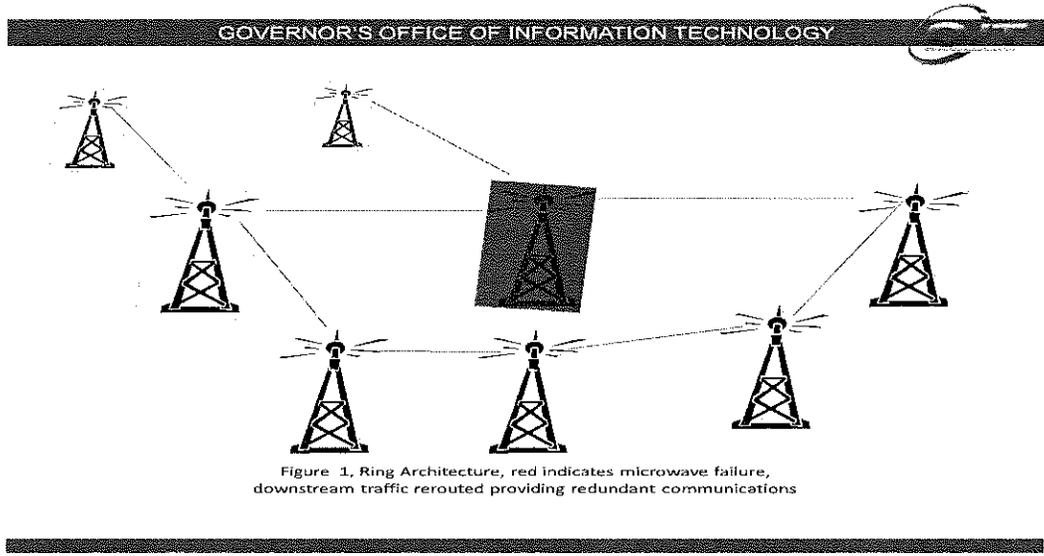
The Office of Information Technology (OIT) requests \$11,193,784 in General Funds for FY 2016-17 for continuation of the upgrade and replacement to the State Microwave system. The Microwave system provides critical connectivity among the Digital Trunked Radio System (DTRS) communications transmitter sites, the State’s principal public safety communications system. The request includes funding for a network management system, obsolete Microwave radio replacement, Microwave radio upgrades, battery equipment, test equipment, spare and ancillary equipment, Federal Communication Commission licensing and coordination, training, project management, administration, engineering, and installation. This is the second year of funding for the five-year project. Funding for phase one of this project was approved by the General Assembly per SB15-234.

### Project Description:

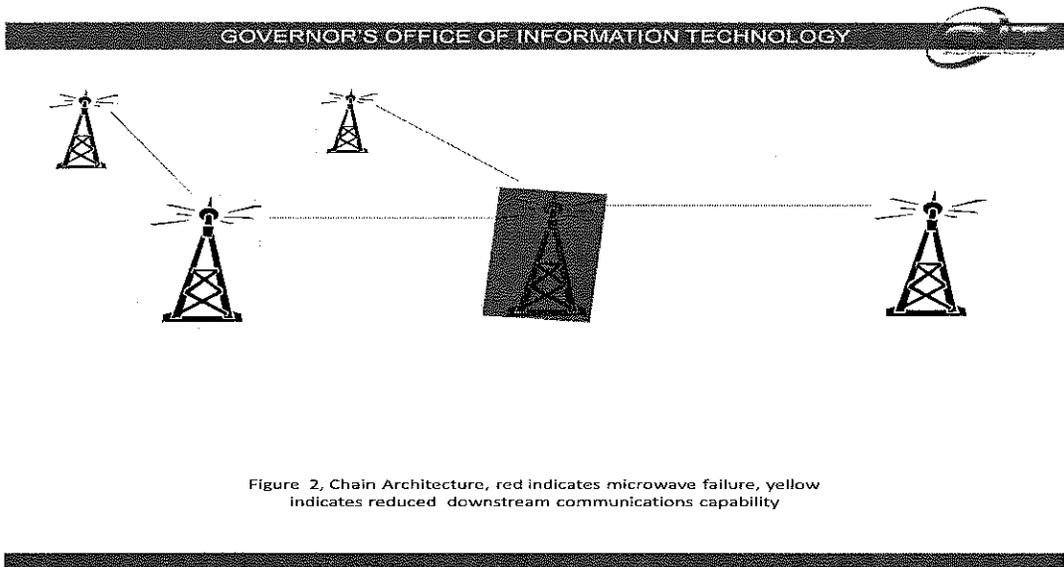
This request addresses the urgent and immediate need to replace and upgrade the Microwave transmitter system, which serves to connect each DTRS (State and Local) transmitter site within the State of Colorado. It includes all Microwave associated equipment used to support a new system, namely network monitoring – management system, Microwave radios, battery backup power systems, test equipment, vendor supported Microwave radio maintenance training, spare Microwave radio equipment, FCC licensing and coordination, project management, administration, engineering, and installation.

Additionally, this request addresses critical technological restrictions of the current system, namely redundancy by initiating a “Ring” technology (Figure 1) which provides the ability to send all traffic in multiple directions, expansion of additional DTRS sites by increasing system circuit capability, system monitoring by providing the ability to test and diagnose the entire system from a central location,

minimizing maintenance expenses' for spares (parts), training, maintenance by keeping with one product platform, technological solution.



The obsolete portion of the Microwave system (60% of state system) will be replaced with new Microwave radios. The remaining 40%, which is manufacturer supported, will be upgraded leveraging re-use (reducing funding requirement), extending useful life, and integrating to a new single operating platform. Since the current Microwave system is structured in a chain fashion (Figure 2), there cannot be a phased replacement approach. Any break in the chain inserting the new technology would create islands of differing technology that would not be of the same level redundancy or technology structure, thus further complicating both ongoing maintenance and replacement of the Microwave system. Breaking the chain would directly affect the ability of the State to provide communications to the level required for Public Safety.



The current State Microwave system is an architecture based on legacy redundancy technology of a main and backup Microwave transmitter at all sites and is connected to other sites like a chain. Any failure in the chain can render the downstream transmitter sites with reduced communications capabilities. The new ring, or loop topology, enables the Microwave radio to send all traffic the opposite direction of the failure, which greatly reduces the large scale communications outages common to a chain technology. The following schedule is outlined in the assessment to upgrade and replace the Microwave system.

- In FY 2015-16, replace and upgrade the Western Slope, Ring 1(20 backbone sites), and Southeast, Ring 2 (12 backbone sites). This pattern will make the most substantial connectivity impact on the system.
- In FY 2016-17, concentrate on Ring 3, in the Northeast, and Ring 4 in the Southwest (32 backbone sites). In FY16-17, replace or upgrade the spur sites associated with the prior four Ring implementations.
- Finally in FY2017-18, the Denver Metro, Ring 5, consisting of 6 sites, would be replaced or upgraded along with all remaining spur sites.

The assessment recommends creating five rings, or loops, within the State utilizing existing communications sites. The State PSCN (Public Safety Communications Network) suggested additional system expansion of six Microwave transmitter sites to resolve ongoing circuit capacity and signal transmission issues due to the physics surrounding excessive Microwave path lengths. While the assessment includes the Microwave equipment, it does not include the cost of constructing a communications-transmitter site.

The estimate for six additional sites are based on the recently constructed New Raymer site requested by the Colorado State Patrol, to replace the coverage lost as a result of Weld Counties election to construct its own communications system. The New Raymer communications site included a 199' feet self supporting tower, communications building, backup power generator and transfer switch, site excavation, and site grounding. Most undeveloped communications sites have additional cost for excessive excavation, utility installation, land-lease, and access easements.

Based on the aforementioned, we estimate a communications site construction near \$750,000 per site for an additional request amount of \$4,500,000 beyond the assessment. This amount distributed during the fiscal year associated the ring undergoing the Microwave replacement or upgrade. Therefore, the four sites recommended (Grand Junction, Gunnison, Castle Peak, a site between Boyero and Haswell) for an estimated total of \$3,000,000, would be constructed during FY2015-16. The site between Boyero and Anton, Akron and Logan County Communications Center, estimated at \$1,500,000, would be constructed during FY 2016-17.

The project would be completed over three years. The intent is to contract with one vendor and utilize benefit from a turnkey, milestone financed lease-purchase agreement. The agreement would further negotiate the terms of manufacturer supported life-cycle providing the greatest benefit to the State.

The assessment recommends avoiding a phased approach that could take an extended amount of time to implement. A phased approach could expose the State to greater liability associated by imminent Microwave system failure and inability for first responders to communicate during times of emergency. The longer it takes to implement an upgraded or new system, the greater the likelihood of manufacturer obsolescence or system failure. Although 40% of existing equipment is reusable, some of it is now at least

five years old. If the State decides to proceed with a phased approach, the plan should allow for completion of as many rings as possible for each phase.

**Background and Justification:**

The Microwave radio vendor has ceased product and parts support of the existing legacy Microwave system. Repair parts are only available via third party and with increasingly difficulty and reliability. The statewide public safety communications system requires immediate Microwave infrastructure replacement in order to mitigate risks associated with imminent failure. The Joint Budget Committee (JBC) approved \$300,000 in FY 2014 from the Public Safety Trust Fund for an assessment of the State Microwave system. The State hired an independent communications consultant to complete an assessment of the DTRS Microwave infrastructure and determined the Microwave system needed immediate replacement and upgrades to prevent the threat to human life that a system failure could cause. The State, along with the newly formed SB 14-127, Public Safety Communications Subcommittee (PSCS), which represents all communications systems within the State, is fully supportive of the recommendation to immediately refresh the State Microwave system as the highest priority. It must be noted that state, local, regional, tribal, and federal representation are all included as participants of the PSCS.

The current Microwave system is aging and does not meet the reliability needs of the critical communications traffic it carries. The majority of the Microwave stations and their ancillary equipment have become obsolete. The assessment done by an independent contractor found that sixty-percent of the 377 Microwaves radio stations in Colorado have reached a point in their life cycle where the manufacturer no longer supplies parts and service, making the system difficult to support and posing huge liability concerns to Public Safety first responders.

The statewide Digital Trunked Radio System (DTRS) is the primary public safety voice communications system for first responders in Colorado. The DTRS is a technical success and has a long history of providing the framework and infrastructure to support interoperable communications to over 1000 public safety and first responder agencies across Colorado.

The DTRS is a continuation program envisioned in the early 1990's, which came to fruition in 1998, to replace multiple disparate wireless communications systems operated by state and local government agencies. DTRS is being planned and constructed through partnerships between state, local, regional, tribal and federal government agencies. DTRS replaced disparate and obsolete radio systems and is available to all public safety, public service, and other governmental agencies. Agencies may choose to use DTRS as their primary radio system or for interoperability only.

DTRS provides a near seamless statewide wireless system that enables direct communications between agencies that must communicate during times of emergency. DTRS supports wireless voice and in the future data communications on a single integrated system based upon the Project 25<sup>1</sup> (P25) suite of open standards. The main deliverables of DTRS are improved communications for all participating agencies with significant improvement in interoperability between agencies. The DTRS meets the highest level of

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<sup>1</sup> The Association of Public-Safety Communications Officials (APCO) Project 25 refers to a suite of standards for digital land mobile radio (LMR) communications which provides for public safety agencies to have interoperable communications, using various manufacturers' equipment.

interoperability for Technology on the SAFECOM Interoperability Continuum. DTRS has received funding through the Public Safety Trust Fund created by HB98-1068, and more recently through Homeland Security, Colorado Wireless Interoperability Network (CWIN), Energy and Mineral Impact, Public Safety Interoperable Communications (PSIC) and other Federal Grants.

The DTRS infrastructure currently consists of 213 active radio sites operating on five Zone Switch Controllers and provides mobile radio coverage to approximately 93%-95% of State roadways, utilizing frequencies in both the 700 MHz and 800 MHz bands. There are nearly 88,044 ID's operating on DTRS, representing over 1,000 local, regional, tribal, state and federal agencies. These users represent approximately 1/3 State, 2/3 local, regional, tribal and federal government agencies. The statewide DTRS covers the largest amount of population within the State of Colorado. State of Colorado OIT engineers and technicians are responsible for the service and maintenance of roughly 2/3 of the statewide network. In 2013, the system averaged over 13,000 hours of talk time each month and handled over 91 million calls. The System has an approximately 13 sites planned and funded for implementation in 2014 and 2015 to provide additional coverage.

In July 2008 and April 2009, DTRS benefitted from \$7.9 million in hardware and software upgrades funded through State capital construction funds. Upgrade benefits included transition to an IP-based network environment, space to add IP-based and hard-wired dispatch consoles, security hardening, as well as a supported platform for growth with future P25 technologies

In FY 2013-14, OIT submitted and received a capital construction request for \$14.9 million to upgrade the DTRS core software to the current supported version 7.14. This was a four year lease-purchase program which provided the full upgrade implementation during the initial year.

During the 2014 legislative session, the Colorado General Assembly approved HB 14-1203, providing \$3.5 million General Fund dollars to support the replacement of legacy DTRS equipment and hardware at radio tower sites with an additional \$3.7 million starting in FY17-18 for DTRS software assurance. Funding for HB 14-1203 expires in FY 2025-26. These funds will replace 22 mountain top DTRS transmitters systems per annum and are specifically used to for the replacement of legacy radio equipment and hardware at the DTRS tower sites. The funds appropriated in HB 14-1203 cannot be used to replace and upgrade the Microwave System because those funds are specifically used to replace legacy radio equipment and hardware, for which the Microwave system would not qualify. Funding for the Microwave systems were proposed as a result of the microwave assessment in July 2014.

The DTRS rides on a Microwave backbone which provides connectivity between the 213 communications sites, five zone switch controllers, and 45+ dispatch centers. DTRS, dependent upon the Microwave system, was originally built, owned, operated and maintained by the State to support the various communications systems prior to deployment of DTRS.<sup>2</sup> This original Microwave backbone of 115 State-owned hops was upgraded from an analog to a digital system in the early 1990's. It is currently comprised of approximately 200 Microwave hops (80 of which have been added by local agencies since 1998). The State is now responsible for ownership and maintenance of 91% of the DTRS Microwave system. It now has reached its end of life and needs to be replaced to meet the additional capacity and redundant reliability requirements necessary to support DTRS' critical mission.

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<sup>2</sup> A hop is a Microwave communications link between two sites, consisting of two Microwave radios, one located at each site.

Though highly interconnected, a distinction exists between the DTRS (Digital Trunked Radio System) and the Microwave System. The DTRS is the portion of the Public Safety Communications Network most commonly known as a two-way radio. For example, the Colorado State Patrol (CSP) dispatches a trooper to an accident scene over the two-way DTRS radio. The Microwave radio system connects, interconnects all DTRS transmitter sites to the 5 DTRS Zone Controllers. Without the state Microwave system, more than 213 DTRS mountain top transmitter sites would be separate and independent communications systems with no interoperability. To expand on the example, CSP dispatches from headquarters on Kipling Street, the dispatch console is connected to the Microwave system which in turn connects to the Zone Controller located at a secure facility. From there the Microwave connects to one of 213 mountain top DTRS transmitters that the State trooper is affiliated with. The DTRS mountain top transmitter then transmits the dispatched message to the State Trooper in his/her patrol car. HB 14-1203 supports the DTRS portion of the Public Safety Communications Network.

DTRS is an exceptional representation of successful partnerships between all levels of government using advanced technologies to achieve a singular goal: effective interoperable public safety communications. Due to its expansive growth, DTRS now faces considerable challenges with regard to sustainable funding to support daily operations, increase in technology based capacity to support user's needs, and the replacement of aging equipment.

### **Implementation Plan**

#### *Direct procurement strategy*

The assessment indicates that a direct procurement strategy provides the greatest value to the State by using a structured procurement method while leveraging reuse of approximately 40% of the existing Microwave radio equipment. The most viable option for the State is to consider a low-interest, lease-purchase agreement with the existing vendor that would enable a complete system upgrade to current technology, minimize the initial capital outlay, and protect against manufacturer product obsolescence.

The assessment recommends the following implementation plan to upgrade and replace the Microwave system:

In FY2015-16, replace or upgrade the Western Slope, Ring 1 (20 Microwave backbone sites), the Southeast, Ring 2 (12 backbone sites). Construct four new Microwave sites to complete the two Rings, initiate the replacement or upgrade of spur sites associated the Ring 1 and 2, procure spare parts and test equipment, and complete technical training for all State communications specialists.

In FY2016-17, replace or upgrade the Northeast, Ring 3, the Southwest, Ring 4 (32 backbone sites), construct two new Microwave sites, continue replacement or upgrades of the spur sites associated the prior four ring implementations.

In FY2017-18, replace or upgrade the Denver Metro, Ring 5 consisting of 6 sites, complete replacement or upgrade of remaining spur Microwave sites.

### **Cost Savings and Improved Performance Outcomes**

OIT intends to reuse near 40% of the existing system, which is still supported by manufacturer. Instead of a total system replacement, upgrading existing equipment will save the State upwards of \$6.9 million.

Additionally, there will be savings associated with utilizing the same Microwave radio in reduction of surplus-repair parts and technical training for our maintenance staff. There will be further and undefined

savings associated the ability to monitor and diagnose network failures prior to dispatching repair crews, and reducing down time.

### **Security and Backup/Disaster Recovery**

All frequencies used in the new Microwave system require licensing are in compliance with the FCC Rules and Regulations, Part 101 for exclusive use.

Currently, the State does not use any type of payload security encryption on any of the State or local government owned Microwave hops. The State requires that the new Microwave system have the capability of security encryption in the event the state or any local government agencies require the use of encryption.

### **Systems Integration Opportunities**

The proposed Microwave system will provide more circuits, which in turn, could offer extensive expansion, interoperable access points throughout the entire State. These access points could support multiple communications systems.

The proposed Microwave system is a supportive technology of current LTE (Long Term Evolution) architectures currently being defined.

### **Program Plan**

The assessment was the product of discussions between the JBC staff and OIT Executive Leadership Team in effort to establish and support through independent analysis the necessity, urgency, and forward strategy addressing the State Microwave System.

### **Life Cycle Cost (LCC) Analysis and Project Alternatives**

#### **Consequences if not funded:**

If not funded, the Microwave system will suffer an unrecoverable electronic failure, posing critical liability to the State for the inability of First Responders to complete mission critical and life saving task both during routine performance and in event of catastrophic events, such as flood or fires. Sixty percent of the existing system is not manufacture supported for parts or service. For example, if lightning struck one of the mountain top transmitter sites destroying the obsolete microwave, the State would not be able to repair the outage. OIT would be required to purchase a new microwave which would take months to replace, all the while the local or regional communications associated this area could be crippled or non-existent. This would put the citizens and visitors of Colorado in jeopardy by not being able to provide communications to the First Responders' providing emergency relief. PSCN can no longer maintain this obsolete, unsupported microwave communications backhaul equipment.

Without exception, all partnering DTRS infrastructure partners (Counties, Local Government) have replaced their obsolete DTRS microwave systems. The State is the sole entity that has not addressed this critical life safety concern and is the weakest point of failure within the statewide systems. The local government entities have determined the critical need to refresh and maintain the DTRS as one of the highest Public Safety needs.

There are no alternatives to replacing the microwave system in Colorado. Each DTRS mountaintop transmitter site, each dispatch center, each Local Government DTRS partner, connects to the State Zone Controllers' via a microwave link. To cover the great expanse and diverse topology of the State of Colorado requires the use of microwave. The assessment suggests the replacement and upgrade is the most fiscally responsible method of addressing this critical communications issue.

There is no telephone, fiber optic circuits to over 99% of the mountain top sites. Furthermore, neither satellite, nor other terrestrial technologies are available. The cost associated changing systems at this juncture are estimated to be in the hundreds of millions. The cost for these circuits, if available, would far exceed the cost of a new microwave system. It must also be mentioned that the State is using one fiber and several telephone circuits. These circuits have been the weakest portions of the backhaul system, responsible for the longest outages to date, to further rely on this type technology for Public Safety will put great liability upon the State.

**Assumptions for Calculations:**

Vendor financing means that the vendor provides equipment and services to a customer with an agreement that the vendor bears the cost of the procurement, and the customer makes payments to the vendor according to contract terms. The current economic landscape has increased pressure on vendors to offer these financing packages. The effective interest rates vary from offering to offering and vendor to vendor, but are usually in the 3% to 4.5% range. These vendor offerings are usually in the form of a lease-purchase package. While there are many nuances among these vendor offerings, OIT recognized that one of the items that varies widely, are the payment terms. Vendors have recently offered:

- Annual payments in arrears beginning at system acceptance;
- Annual payments in advance starting at system acceptance;
- Monthly or quarterly payments in advance starting at system acceptance.

With these arrangements, usually the financial underwriter will want the customer to restrict the term to ten years and require a full maintenance contract including software and hardware updates for the term of the lease. Agencies that have in-house maintenance organizations can negotiate modifications to the agreement.

If using this approach for system procurement and implementation, the customer should understand that they would not own the equipment until the lease ends and they exercise the buyout clause (generally a \$1 payment). Once lease execution is completed, a separate transaction is necessary to add equipment or expand the system unless the initial lease addresses these provisions.

Table 1 summarizes the estimated equipment costs for all backbone and spur hops (state and local government), including frequency coordination and FCC licensing.

**Table 1 – Equipment Cost Estimates**

<b>Equipment Cost Estimate</b>			
<i>Network Management</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Extended Cost</i>
Network Management System	1	\$240,000	\$240,000
Network Management Terminal	2	\$5,000	\$10,000
<b>Subtotal</b>			<b>\$250,000</b>
<i>Microwave Site Expansion</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Extended Cost</i>
Transmitter site construction	6	\$750,000	\$4,500,000
<b>Subtotal</b>			<b>\$4,500,000</b>
<i>Microwave Equipment</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Extended Cost</i>
50Mbps Hot Standby radio	166	\$43,900	\$7,287,400
150Mbps Non-Standby radio	108	\$25,400	\$2,743,200
50Mbps Non-Standby radio	108	\$23,200	\$2,505,600
MDR-8000 Ethernet upgrade kit	158	\$7,500	\$1,185,000
Service router for IP/MPLS	262	\$12,000	\$3,144,000
Rack and accessories	169	\$10,500	\$1,774,500
<b>Subtotal</b>			<b>\$18,639,700</b>
<i>Battery Equipment</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Extended Cost</i>
48VDC backbone battery system	65	\$25,000	\$1,625,000
48VDC spur battery system	98	\$17,000	\$1,666,000
<b>Subtotal</b>			<b>\$3,291,000</b>
<i>Ancillary Equipment</i>	<i>Quantity</i>	<i>Unit Cost</i>	<i>Extended Cost</i>
Single polarized parabolic antenna	172	\$5,500	\$946,000
Dual polarized parabolic antenna	138	\$12,500	\$1,725,000
EWP63-59W or EW90 waveguide	310	\$3,000	\$930,000
Antenna / waveguide accessories	310	\$1,600	\$496,000
Dehydrator with full alarm package	165	\$3,500	\$577,500
<b>Subtotal</b>			<b>\$4,674,500</b>
<b>Total Equipment Cost Estimate</b>			<b>\$31,938,100</b>

Table 2 summarizes the total capital cost estimates, including system equipment and services.

**Table 2 – Total Capital Cost Estimates**

<b>Total Capital Cost Estimates</b>	
<i>System Equipment</i>	<i>Extended Cost</i>
Network Management System	\$250,000
Microwave Site Expansion	\$4,500,000
Microwave Radio Equipment	\$18,639,700
Battery Equipment	\$3,291,000
Ancillary Equipment	\$4,674,500
FCC Licensing and Coordination	\$582,900
<b>Subtotal</b>	<b>\$31,938,100</b>
<i>System Services</i>	<i>Extended Cost</i>
Spare Equipment	\$2,685,800
Test Equipment	\$537,500
Training	\$269,000
PM/Engineering/Installation	\$8,056,800
Local Government Expansion	\$185,600
State PM and Administration	\$6,714,100
<b>Subtotal</b>	<b>\$18,448,800</b>
<b>Total Capital Cost Estimate</b>	<b>\$50,386,900</b>

Actual pricing will vary and is dependent upon a number of factors at the time of purchase. Some of these factors include final design criteria, market conditions and the competitive landscape. Per the State’s request, the capital cost estimate does not include extended warranty. It is important to note that the capital cost estimate does not include any state or local sales tax.

Table 3 provides a breakdown of the Ring cost estimates for the State and local government.

**Table 3 – Ring cost estimate for State and local government**

<b>Phase</b>	<b>State of Colorado</b>	<b>Local Government</b>	<b>Total</b>
Ring 1	\$15,880,400	\$1,055,300	<b>\$16,935,700</b>
Ring 2	\$6,054,300	\$528,600	<b>\$6,582,900</b>
Ring 3	\$6,240,900	\$2,535,500	<b>\$8,776,400</b>
Ring 4	\$11,963,300	\$0	<b>\$11,963,300</b>
Ring 5	\$6,128,600	\$0	<b>\$6,128,600</b>
<b>Total</b>	<b>\$46,267,500</b>	<b>\$4,119,400</b>	<b>\$50,386,900</b>

Tables 4-6 provide a detailed total cost estimate of replacing and upgrading the five rings over three years.

**Table 4 – State and Local Government Ring estimate by Fiscal Year 2015-16**

<b>Ring Cost Estimate (FY 2015-16)</b>					
<i>Item</i>	<i>Ring 1</i>		<i>Ring 2</i>		<i>FY 2015-16 Total</i>
	<i>State</i>	<i>Local</i>	<i>State</i>	<i>Local</i>	
Network Management System	\$250,000	\$0	\$0	\$0	\$250,000
Microwave Site Expansion	\$2,250,000	\$0	\$750,000	\$0	\$3,000,000
Microwave Radio Equipment	\$5,377,600	\$340,600	\$2,198,500	\$243,100	\$8,159,800
Battery Equipment	\$966,000	\$102,000	\$386,000	\$0	\$1,454,000
Ancillary Equipment	\$1,411,400	\$150,000	\$535,900	\$54,400	\$2,151,700
FCC Licensing and Coordination	\$181,900	\$12,000	\$61,700	\$4,800	\$260,400
Spare Equipment	\$800,500	\$59,300	\$312,100	\$29,800	\$1,201,700
Test Equipment	\$160,100	\$11,900	\$62,500	\$6,000	\$240,500
Training	\$80,100	\$6,000	\$31,300	\$3,000	\$120,400
PM/Engineering/Installation	\$2,401,500	\$177,800	\$936,200	\$89,300	\$3,604,800
Local Government Expansion	\$0	\$47,500	\$0	\$23,800	\$71,300
State PM and Administration	\$2,001,300	\$148,200	\$780,100	\$74,400	\$3,004,000
<b>Total</b>	<b>\$15,880,400</b>	<b>\$1,055,300</b>	<b>\$6,054,300</b>	<b>\$528,600</b>	<b>\$23,518,600</b>

**Table 5 – State and Local Government Ring estimate by Fiscal Year 2016-17**

<b>Ring Cost Estimate (FY 2016-17)</b>					
<i>Item</i>	<i>Ring 3</i>		<i>Ring 4</i>		<i>FY 2016-17 Total</i>
	<i>State</i>	<i>Local</i>	<i>State</i>	<i>Local</i>	
Network Management System	\$0	\$0	\$0	\$0	\$0
Microwave Site Expansion	\$1,500,000	\$0	\$0	\$0	\$1,500,000
Microwave Radio Equipment	\$1,797,000	\$957,400	\$5,303,600	\$0	\$8,058,000
Battery Equipment	\$404,000	\$170,000	\$726,000	\$0	\$1,300,000
Ancillary Equipment	\$586,000	\$300,800	\$994,000	\$0	\$1,880,800
FCC Licensing and Coordination	\$58,600	\$21,600	\$163,500	\$0	\$243,700
Spare Equipment	\$278,700	\$142,900	\$702,400	\$0	\$1,124,000
Test Equipment	\$55,800	\$28,600	\$140,500	\$0	\$224,900
Training	\$27,900	\$14,300	\$70,300	\$0	\$112,500
PM/Engineering/Installation	\$836,100	\$428,500	\$2,107,100	\$0	\$3,371,700
Local Government Expansion	\$0	\$114,300	\$0	\$0	\$114,300
State PM and Administration	\$696,800	\$357,100	\$1,755,900	\$0	\$2,809,800
<b>Total</b>	<b>\$6,240,900</b>	<b>\$2,535,500</b>	<b>\$11,963,300</b>	<b>\$0</b>	<b>\$20,739,700</b>

Table 6 – State and Local Government Ring estimate by Fiscal Year 2017-18

<b>Ring Cost Estimate (FY 2017-18)</b>			
<i>Item</i>	<i>Ring 5</i>		<i>FY 2016-17 Total</i>
	<i>State</i>	<i>Local</i>	
Network Management System	\$0	\$0	\$0
Microwave Site Expansion	\$0	\$0	\$0
Microwave Radio Equipment	\$2,421,900	\$0	\$2,421,900
Battery Equipment	\$537,000	\$0	\$537,000
Ancillary Equipment	\$642,000	\$0	\$642,000
FCC Licensing and Coordination	\$78,800	\$0	\$78,800
Spare Equipment	\$360,100	\$0	\$360,100
Test Equipment	\$72,100	\$0	\$72,100
Training	\$36,100	\$0	\$36,100
PM/Engineering/Installation	\$1,080,300	\$0	\$1,080,300
Local Government Expansion	\$0	\$0	\$0
State PM and Administration	\$900,300	\$0	\$900,300
<b>Total</b>	<b>\$6,128,600</b>	<b>\$0</b>	<b>\$6,128,600</b>

<b>ADDITIONAL REQUEST INFORMATION</b>		
Please indicate if three-year roll forward spending authority is required.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Date of project's most recent Business Process Analysis:	NA	
Please provide the link to the Business Process Analysis or attached the first page of the analysis to this document:	NA	
Request 6-month encumbrance waiver?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New	<input type="checkbox"/> Renovation
	<input type="checkbox"/> Expansion	<input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	ASF	GSF
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?	NA	

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
In FY 2015-16, replace and upgrade the Western Slope Ring 1(20 backbone sites), Southeast Ring 2 (12 backbone sites). This pattern will make the most substantial connectivity impact on the system.	July, 2015	
In FY 2016-17, concentrate on Ring 3, in the Northeast, and ring 4 in the Southwest (32 backbone sites). In FY16-17, replace or upgrade the spur sites associated with the prior four ring implementations.	July 2016	
FY2017-18, the Denver Metro Ring 5, consisting of 6 sites, would be replaced or upgraded along with all remaining spur sites.	July 2017	<b>January 2018</b>



Chair, Monte Moses  
Vice Chair, Luis Colon  
Maia Babbs  
John Anderson  
Renny Fagan  
Jeanette Garcia  
Richard Kaufman  
Vanecia Kerr  
Tom McGimpsey  
Paula Sandoval  
BJ Scott

Senator Tim Neville, Chair  
Joint Technology Committee  
Colorado General Assembly  
Room 029, Colorado State Capital  
Denver, CO 80203

September 1, 2015

Dear Honorable Senator Neville:

This transmittal letter accompanies the electronic submission of the six information technology requests and appropriate documents submitted by the state institutions of higher education as related to the FY 2016-17 capital and technology budget requests. The documents include the required financial forms, appropriate narrative forms, and program plan waiver requests.

### **Technology Requests Review Process**

On July 24, state institutions of higher education submitted to the Colorado Department of Higher Education six information technology requests. The Colorado Commission on Higher Education's (CCHE) Fiscal Affairs and Audit Standing Committee (FAA) and Department of Higher Education (DHE) staff will review all requests for the FY 2016-17 budget cycle. For prioritization, staff will apply a uniform set of criteria to all capital submissions including technology requests, which were ranked and prioritized along side capital requests.

The FAA will hold public meetings to review the projects, and make changes to the draft priority list following a period of public comment. On September 22, the FAA will finalize and vote to forward the final priority list to CCHE for consideration and commission approval at the October 29, 2015 meeting.

If you have any questions or need additional information, please call me, and thank you for your consideration.

Sincerely,

Andrew J. Rauch  
Lead Finance Analyst  
Colorado Department of Higher Education



cc: Representative Max Tyler, Vice-Chair, Joint Technology Committee  
Senator Linda Newell, Joint Technology Committee  
Senator Beth Martinez Humenik, Joint Technology Committee  
Representative Jonathan Singer, Joint Technology Committee  
Representative Jack Tate, Joint Technology Committee  
Jessika Shipley, Joint Technology Committee Staff  
Matt Kiszka, Joint Technology Committee Staff  
Matt Becker, Joint Technology Committee Staff  
Gary Lucas, Joint Technology Committee Staff  
Erick Scheminske, Office of State Planning and Budget  
Alexis Senger, Office of State Planning and Budget  
Kachina Weaver, Chief Legislative and Strategic Policy Officer, Department of Higher Education  
Diane Duffy, Chief Financial Officer, Department of Higher Education



College	Priority Ranking	Non-Prioritized Continuation Project Description	FY 2016-2017 Total Request	FY 2016-2017 CCFE Request	Total Project Request
PCC	NP	Davis Academic Building	\$5,807,143	\$5,807,143	\$9,376,762

College	Priority Ranking	Capital Construction Project Description	FY 2016-2017 Total Request	FY 2016-2017 CCFE Request	Total Project Request
FRCC	1	Larimer Campus Allied Health and Nursing Building	\$26,563,971	\$19,657,338	\$26,563,971
PPCC	2	Student Learning Commons and Black Box	\$6,550,995	\$4,847,735	\$6,550,995
OJC	3	Agriculture Science Remodel	\$1,793,800	\$1,393,800	\$1,793,800
ACC	4	Learning Commons	\$2,362,387	\$1,748,166	\$5,388,296
LCC	5	Vocational Trades Building	\$1,996,733	\$1,996,733	\$1,996,733
		<b>TOTAL</b>	<b>\$39,267,886</b>	<b>\$29,643,772</b>	<b>\$42,293,795</b>

College	Priority Ranking	Information Technology Project Description	FY 2016-2017 Total Request	FY 2016-2017 CCFE Request	Total Project Request
CCD	1	Technology Infrastructure	\$1,342,134	\$993,179	\$1,342,134
LCC	2	Technology Infrastructure	\$644,400	\$644,400	\$644,400
PCC	3	Critical Core Technology	\$1,490,050	\$1,490,050	\$1,490,050
OJC	4	Technology Infrastructure	\$637,500	\$637,500	\$637,500
		<b>TOTAL</b>	<b>\$4,114,084</b>	<b>\$3,765,129</b>	<b>\$4,114,084</b>

**Form CC-P**

**Five-Year Capital Construction Program FY 2016-17 to FY 2020-21**

**Prepared By:** Duane E. Risse

**Phone:** 303-352-3356

**E-Mail:** [duane.risse@ccd.edu](mailto:duane.risse@ccd.edu)

**Agency or Institution:** Community College of Denver

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Technology Infrastructure	Capital Construction	CCF	\$993,179	\$0	\$993,179	\$0	\$0	\$0	\$0
	1 Cash Funds	CF	\$348,955	\$0	\$348,955	\$0	\$0	\$0	\$0
<b>Purpose Code:</b>	F4	Reappropriated Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Gross Square Ft:</b>	N/A	Federal Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Project Type</b>	Total Funds	TF	\$1,342,134	\$0	\$1,342,134	\$0	\$0	\$0	\$0

**CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17**

<b>Agency or Institution:</b>	Community College of Denver	<b>Signature Department or Institution Approval:</b>	 Date: 8/13/15
<b>Project Title:</b>	Technology Infrastructure	<b>Signature CCHE Approval:</b>	Andrew J. Rauch 8/13/15 Date
<b>Project Year(s):</b>	FY 2016 - 17	<b>Signature OIT Approval:</b>	Date
<b>Agency or Institution Priority Number:</b>	1	<b>Signature OSPB Approval:</b>	Date
<b>Program Plan:</b>	N/A	<b>Name and e-mail address of preparer:</b>	Duane Risse Duane.Risse@ccd.edu

Revision? <input type="checkbox"/> No <input checked="" type="checkbox"/> X If yes, last submission date: _____	Total Project Costs	Total Prior Year Appropriations	Current Request FY 2016-17	Year 2 Request	Year 3 Request	Year 4 Request	Year 5 Request
<b>A. Land Acquisition</b>							
(1) Land /Building Acquisition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>B. Contract Professional Services</b>							
(1) Consultants/Contractors	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Quality Assurance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Independent Verification and Validation (IV&V)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5) Leased Space (Temporary)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(6) Feasibility Study	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7a) Inflation for Professional Services	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(8) Other Services/Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(9) <b>Total Professional Services</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>C. Associated Building Construction</b>							
(1) (a) New (G5F): New \$ _____/GSF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(b) Renovate GSF: Renovate \$ _____/GSF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Site Work/Landscaping							
(4) Other (Specify)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5a) Inflation for Construction	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(6) <b>Total Construction Costs</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>D. Software Acquisition</b>							
(1) Software COTS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Software Built	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4a) Inflation on Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(5) <b>Total Software</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>E. Equipment</b>							
(1) Servers	\$ 20,000	\$ -	\$ 20,000	\$ -	\$ -	\$ -	\$ -
(2) PCs, Laptops, Terminals, PDAs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Printers, Scanners, Peripherals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Network Equipment/Cabling	\$ 1,258,223	\$ -	\$ 1,258,223	\$ -	\$ -	\$ -	\$ -
(5) Other (Specify) Switches	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(6) <b>Miscellaneous</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7) <b>Total Equipment and Miscellaneous Costs</b>	\$ 1,278,223	\$ -	\$ 1,278,223	\$ -	\$ -	\$ -	\$ -
<b>F. Operating Cost</b>							
(1) Maintenance Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Repair Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Staffing/Employee Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5) <b>Total Operating Costs</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>G Total Project Costs</b>	\$ 1,278,223	\$ -	\$ 1,278,223	\$ -	\$ -	\$ -	\$ -
<b>H. Project Contingency</b>							
(1) 5% for New	\$ 63,911	\$ -	\$ 63,911	\$ -	\$ -	\$ -	\$ -
(2) 10% for Renovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) <b>Total Contingency</b>	\$ 63,911	\$ -	\$ 63,911	\$ -	\$ -	\$ -	\$ -
<b>I. Total Budget Request [F+G(3)]</b>	\$ 1,342,134	\$ -	\$ 1,342,134	\$ -	\$ -	\$ -	\$ -
<b>J. Source of Funds</b>							
GF	\$ 993,179	\$ -	\$ 993,179	\$ -	\$ -	\$ -	\$ -
CF	\$ 348,955	\$ -	\$ 348,955	\$ -	\$ -	\$ -	\$ -
RF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
FF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

check (should = H)      \$ 1,342,134      \$0 \$ 1,342,134      \$0      \$0      \$0      \$0      \$0



# DEPARTMENT OF HIGHER EDUCATION COMMUNITY COLLEGE OF DENVER

John W. Hickenlooper  
Governor

James T. Rizzuto  
Executive Director

*FY 2016-17 IT Capital Budget Request  
July 3, 2015*

  
Signature \_\_\_\_\_ Date \_\_\_\_\_

## *Department or CCHE Capital Construction Priority: 1 Technology Infrastructure*

Summary of Capital Construction Request	Total Funds	GF	Cash Funds*	Federal Funds
FY 2016-17	\$1,342,134	\$993,179	\$348,955	0
FY 2017-18	0	0	0	0
FY 2018-19	0	0	0	0

*\*For Higher Education institutions, please make a notation here if the institution is participating in the Intercept Program.*

### **Request Summary:**

Community College of Denver (CCD) is requesting \$1,342,134 to update and improve our technology infrastructure and telephony equipment. It has been 11-12 years since our last major network upgrade and the phone system that we share with the Auraria campus requires a major upgrade in order to remain under support.

### **Project Description:**

The Technology Infrastructure Project will involve replacement and/or upgrade of the majority of the network infrastructure including upgrades to our wireless and security systems that support mobile connectivity for students, staff and faculty on Campus. The telephony project will involve moving to the Colorado Community College System (CCCS) managed Cisco VoIP phone system and replacing all handsets.

### **Background and Justification:**

A significant amount of our network infrastructure equipment on the CCD campus is outdated and we run the risk of network outages or performance issues that greatly impact our ability to support the growing network traffic on our wired and wireless networks. Performance of the existing network is not sufficient to support the deployment of workstations, virtual desktops and a growing use of multimedia and electronic technology for education. Security systems are also outdated and are not sufficient to monitor unauthorized usage on our network. There is more pressure to provide digital alternatives for securely storing sensitive data. Data backups are also impacted because of network performance. Our current data backups are often still running during business hours because of the volume of data and limitations of our ability to move it efficiently on our existing network infrastructure.

The phone system CCD currently uses is a shared system on the Auraria campus that is managed by the Auraria Higher Education Center (AHEC). The system is out dated and requires upgrades. Several schools sharing the use of this system have announced intentions to deploy their own systems which will leave a greater percentage of phone system expenses to CCD. The CCCS phone system will also allow CCD to take full advantage of newer VoIP technologies which integrate services with other desktop, messaging and conferencing technologies.

### **Project Alternatives:**

The alternative to completing the network infrastructure project will be to make smaller equipment replacements over time, but this approach would impact the overall goal of re-designing the infrastructure in order to better support the growing network load. A significant portion of the core network is nearing end of life currently. Remaining on current network equipment will risk failures that could shut down overall business operations for students, faculty and staff. It will also cause an issue with compatibility across network segments that would reduce our ability to monitor and respond to network performance issues. Not upgrading WiFi and security systems will impact our ability to improve data security and prevent the addition of digital alternatives for secure storage in the future.

The alternative to moving to the CCCS managed phone system would be to continue to utilize the Auraria campus shared Avaya phone system. This option would avoid an initial Capital outlay for handsets, but would have impacts to overall ongoing expenses and capabilities moving forward. In addition to ongoing expenses, the shared Avaya phone system requires upgrades that have been estimated at \$358,000. These upgrades will need to be completed in order to maintain support for the system that has been identified as close to end of life.

### **Implementation Plan:**

The responsibility for implementation of the Technology Infrastructure Project will be the Information Technology Services (ITS) department at CCD in conjunction with the CCCS IT department. Support for the systems will also be shared by CCD ITS and CCCS IT departments. We anticipate vendors from whom we will purchase equipment will be available for consultation and installation support. The majority of the improvements and upgrades will be “behind the scenes” so end users will continue to operate the technology they use with very little interruption and training and enjoy faster, more reliable service. The general plan is to initially replace/upgrade support equipment and then replace end user phone handsets.

### **Alignment with OIT Best Practices:**

The Information Technology Director at CCD has been with the College for over 2 years and has close ties to personnel at IT departments at the System Office and other community colleges with the System. We adhere to System IT policies and procedures to ensure compatibility with System wide connectivity and performance.

### **Cost Benefit and Improved Performance Outcomes:**

We anticipate immediate cost savings upon installation of the phone system. Moving to the CCCS managed phone system will allow CCD to take advantage of an estimated annual expense reduction of approximately \$150,000. Network enhancements will immediately impact performance for student, staff and faculty in classrooms, offices and mobile devices on campus. It will also allow opportunities to take better advantage of virtual technologies that will reduce efforts needed to deploy and support workstations on campus. The technology improvements that will come with completion of this project will improve the speed, accuracy, and efficiency of data flow which, in turn, should improve the efficiency and work performance of students, faculty and staff.

**Security and Backup/Disaster Recovery:**

This Project has as one of its priorities the replacement/upgrade of equipment and software relative to preservation of data. Currently our network is not fast enough to complete data backups during off hours. Often backups are still running during the day which impacts user network performance and our ability to complete successful backups. File contention can cause the failure to backup certain files which has an impact on our ability to recover those files in the event of failure.

**Business Process Analysis:**

The Project is designed to improve equipment performance due to technological advances in the area of data storage, processing, and accessibility. We believe our operational design is effective and efficient and we are looking to improve our business process via improved tools enabling our IT staff to become even more effective and efficient. Increased reliability, ease of access to data, and availability to access information will improve the efficiency and work product of students and staff.

**Systems Integration Opportunities:**

See “Alignment with OIT Best Practices” section.

**Program Plan:**

Request for waiver submitted with this request – Project total under \$2,000,000

**Life Cycle Cost (LCC) Analysis and Project Alternatives:**

Not Applicable

**Consequences if not Funded:**

See “Background and Justification” and “Project Alternatives” section

**Operating Budget Impact:**

Community College of Denver currently has budget line items for ongoing costs such as maintenance agreements, software licenses, and general recurring expenditures such as virus prevention software. We do not expect a material increase in these types of costs over and above normal inflationary increases that would occur as a result of completion of this project.

**Assumptions for Calculations:**

Please see accompanying detail list of Project proposed expenditures.

**Supplemental Justification:**

Not Applicable

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<b>ADDITIONAL REQUEST INFORMATION</b>	
<b>Please indicate if three-year roll forward spending authority is required.</b>	X Yes <input type="checkbox"/> No
Date of project’s most recent Business Process Analysis:	N/A
Please provide the link to the Business Process Analysis or attached the first page of the analysis to this document:	N/A

Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New	<input type="checkbox"/> Renovation
	<input type="checkbox"/> Expansion	<input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	_____ ASF	_____ GSF
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?	N/A	

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
Network Upgrade / Replacement	August 2016	November 2016
WiFi controller and security Upgrade / Replacement	October 2016	November 2016
Telephone System Upgrade / Replacement	January 2017	March 2017

**Form CC-P**

<b>Five-Year Capital Construction Program FY 2016-17 to FY 2020-21</b>		<b>Prepared By:</b> Chad DeBono	
	<b>Phone:</b>	719-336-1517	<b>E-Mail:</b> <a href="mailto:chad.debono@lamarcc.edu">chad.debono@lamarcc.edu</a>

<b>Agency or Institution:</b>	Lamar Community College
-------------------------------	-------------------------

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Technology Infrastructure	Capital Construction Funds	CCF	\$644,400	\$0	\$644,400	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Total Funds	TF	\$644,400	\$0	\$0	\$0	\$0	\$0	\$0
<b>Priority:</b>	1								
<b>Purpose Code:</b>	F4								
<b>Gross Square Ft:</b>	NA								
<b>Project Type</b>									

**CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17**

Agency or Institution:	Lamar Community College	Signature Department or Institution Approval:	 Date: 8/13/15
Project Title:	Technology Infrastructure	Signature CCHE Approval:	Andrew J. Rauch 8/13/15
Project Year(s):	FY 2016 - 17	Signature OIT Approval:	Date
Agency or Institution Priority Number:		Signature OSPB Approval:	Date
Program Plan:	N/A	Name and e-mail address of preparer:	

Revision?	No	Total Project Costs	Total Prior Year Appropriations	Current Request FY 2016-17	Year 2 Request	Year 3 Request	Year 4 Request	Year 5 Request
If yes, last submission date: _____								
<b>A. Land Acquisition</b>								
(1)	Land /Building Acquisition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>B. Contract Professional Services</b>								
(1)	Consultants/Contractors	\$ 12,200	\$ -	\$ 12,200	\$ -	\$ -	\$ -	\$ -
(2)	Quality Assurance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3)	Independent Verification and Validation (IV&V)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4)	Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5)	Leased Space (Temporary)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(6)	Feasibility Study	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7a)	Inflation for Professional Services	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7b)	Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(8)	Other Services/Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(9)	<b>Total Professional Services</b>	\$ 12,200	\$ -	\$ 12,200	\$ -	\$ -	\$ -	\$ -
<b>C. Associated Building Construction</b>								
(1)	(a) New (GSF): New \$ _____ /GSF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2)	(b) Renovate GSF: Renovate \$ _____ /GSF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3)	Site Work/Landscaping	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4)	Other (Specify)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5a)	Inflation for Construction	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5b)	Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(6)	<b>Total Construction Costs</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>D. Software Acquisition</b>								
(1)	Software COSTS	\$ 22,000	\$ -	\$ 22,000	\$ -	\$ -	\$ -	\$ -
(2)	Software Built	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4a)	Inflation on Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4b)	Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(5)	<b>Total Software</b>	\$ 22,000	\$ -	\$ 22,000	\$ -	\$ -	\$ -	\$ -
<b>E. Equipment</b>								
(1)	Servers	\$ 50,000	\$ -	\$ 50,000	\$ -	\$ -	\$ -	\$ -
(2)	PCs, Laptops, Terminals, PDAs	\$ 141,300	\$ -	\$ 141,300	\$ -	\$ -	\$ -	\$ -
(3)	Printers, Scanners, Peripherals	\$ 32,400	\$ -	\$ 32,400	\$ -	\$ -	\$ -	\$ -
(4)	Network Equipment/Cabling	\$ 45,700	\$ -	\$ 45,700	\$ -	\$ -	\$ -	\$ -
(5)	Other (Specify) Switches, IP Phones	\$ 156,000	\$ -	\$ 156,000	\$ -	\$ -	\$ -	\$ -
(6)	<b>Miscellaneous</b>	\$ 184,800	\$ -	\$ 184,800	\$ -	\$ -	\$ -	\$ -
(7)	<b>Total Equipment and Miscellaneous Costs</b>	\$ 610,200	\$ -	\$ 610,200	\$ -	\$ -	\$ -	\$ -
<b>F. Operating Cost</b>								
(1)	Maintenance Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2)	Repair Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3)	Staffing/Employee Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4)	Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5)	<b>Total Operating Costs</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>G</b>	<b>Total Project Costs</b>	\$ 644,400	\$ -	\$ 644,400	\$ -	\$ -	\$ -	\$ -
<b>H. Project Contingency</b>								
(1)	5% for New	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2)	10% for Renovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3)	<b>Total Contingency</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>I</b>	<b>Total Budget Request [F+G(3)]</b>	\$ 644,400	\$ -	\$ 644,400	\$ -	\$ -	\$ -	\$ -
<b>J. Source of Funds</b>								
	GF	\$ 644,400	\$ -	\$ 644,400	\$ -	\$ -	\$ -	\$ -
	CF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	RF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	FF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

check (should = H)

\$644,400

\$0

\$644,400

\$0

\$0

\$0

\$0



# DEPARTMENT OF HIGHER EDUCATION LAMAR COMMUNITY COLLEGE

John W. Hickenlooper  
Governor

*FY 2016-17 Capital Construction Request  
October 1, 2015*

[Name]  
Executive Director

  
Signature

  
Date

**Department or CCHE Capital Construction Priority: 1  
Technology Infrastructure LCC**

Summary of Capital Construction Request	Total Funds	GF	Cash Funds*	Federal Funds
FY 2016-17	\$644,400	\$644,400	0	0
FY 2017-18	0	0	0	0
FY 2018-19	0	0	0	0

*\*For Higher Education institutions, please make a notation here if the institution is participating in the Intercept Program.*

### Request Summary:

Lamar Community College requests \$644,400 to upgrade our technology infrastructure. Areas that will be improved include our wired and wireless networks, servers, IP telephony devices, and instructional technology, as well as, office and classroom computer equipment. These upgrades will improve service availability, security, performance, efficiency, and student/staff productivity.

### Background and Justification:

Many of our systems are outdated (6+ years old) and/or do not support current technologies that improve service availability, security, performance, efficiency, and student learning. Most of our network switches have reached end of vendor software support, and do not support current networking technologies. No new security enhancements or fixes are available for them should a vulnerability be found. Furthermore, our network core is not fault tolerant. The failure of a critical hardware component in our core network switch would result in a complete loss of access to all network, data, internet and phone services for, best case, 5 hours. For students, this could result in losing a day of learning. Our wireless network is unable to take advantage of current advances in wireless technology that provides for more reliable and robust communications, critical for the increasing role it plays in our academic environment. It too, is not fault tolerant. A hardware failure in our wireless network controller would result in a service outage for, best case, 1 day. Data stored on servers is not highly available with failure of a server resulting in loss of data access requiring manual intervention to restore with outages lasting possibly a day or more. All these potential failures would have a substantial negative impact on daily operations, to include instruction. All of our IP phone systems are outdated and no longer vendor supported. They do not receive product updates or security fixes. They are unable to support current technologies that improve user experience. Many of our classrooms have outdated and inadequate instructional technology which makes displaying and viewing content extremely difficult. Many of our office and classroom computers perform poorly due to antiquated technologies that are unable to deliver a highly responsive and capable platform for work and instruction.

**Project Description:**

This project will involve replacing and/or upgrading our network switches, wireless system, servers, and IP telephony devices. Fault tolerance will be added for critical devices through redundancy and automation, reducing the impact of potential critical system failures to seconds, or at most, minutes. Inadequate computer equipment and computer tables will be replaced in offices and classrooms. Multimedia equipment will be added/improved in rooms where current technologies hamper staff and student productivity. The Project, through the introduction of modern, secure, high performing, highly available technology systems, will enable Lamar Community College to more effectively and efficiently deliver on its mission to “Enrich Lives through Learning”.

**Implementation Plan**

Responsibility for implementation of the project will be with Lamar Community College Computer Center staff. All systems will be installed with an emphasis on minimizing impact to daily operations. Classroom will upgrades completed throughout the year during times of non-use (breaks between and during terms). Servers and core switches will be installed during July 2016, remaining switches will be phased in with completion by the end of December 2016. Office computers upgrades/replacements will be phased in from July 2016 through June 2017. Core wireless system component upgrades will take place in July 2017 with complete system implementation by the end of December 2016. Where professional services are to be used, Computer Center staff will work closely with vendors\contractors to ensure a satisfactory installation. Where appropriate, Computer Center staff will provide training and additional support resources to staff and students ensuring they are able to maximize use of new technologies.

**Alignment with OIT Best Practices**

Lamar Community College, as part of the Colorado Community College System, adheres to System IT policies and procedures.

**Cost Savings and Improved Performance Outcomes**

Cost savings will be realized by eliminating or minimizing lost productivity and learning opportunities due to inadequate technologies. Improved performance outcomes in these same areas will be realized as a result of the technologies deployed under this project. The new technologies will provide a modern, secure, high performing, highly capable, and highly available technology infrastructure that will create vastly improved work and learning environments that will enhance productivity and learning.

**Security and Backup/Disaster Recovery**

This project seeks to decrease our security risk through the replacement of outdated systems that no longer receive security fixes or enhancements with current systems/technologies using current security technologies that will continue to be improved.

**Business Process Analysis**

This project is designed to improve the work/learning experience of staff and students by providing a technology infrastructure that will enable increased productivity and maximize learning potential through technological advances in servers, network, client computing, and instructional technologies, that provide a secure, highly accessible, high performing, and efficient environment. IT staff will realize greater efficiencies and effectiveness of existing operational processes through the introduction of tools that allow for increased automation and availability of data/network access, management, and recovery.

## **Systems Integration Opportunities**

See “Alignment with OIT Best Practices” section.

## **Program Plan**

Request for waiver submitted with this request due to project below \$2,000,000

## **Life Cycle Cost (LCC) Analysis and Project Alternatives:**

The overall benefit of this project is the opportunities made available, through technology, for increased productivity and learning for staff and students. Lamar Community College does not anticipate a monetary increase in energy consumption (if any) that would outweigh the gains in productivity and learning enhancements provided by this project. Much of the technology to be implemented will have greater energy efficiency than the technology to be replaced and will offer energy cost savings under comparable usage conditions. New computer systems will be able to remain in production longer do advances in hardware. We do not anticipate incurring additional year over year costs, such as maintenance, support and disposal, which would cause an increase over current allotted budget dollars.

As a project alternative we will continue to implement planned technology improvements as budgeting allows. Unfortunately, due to persistent funding challenges, it has become impossible for us to introduce many of these types of technology improvements in a timely fashion, if at all. For example, based on current budget allocations and assuming stationary annual funding percentage decrease, it will take over 20 years to complete the switch upgrade component of this project alone. It has become necessary to take a “replace when it breaks” replacement strategy for much of our outdated equipment. Another alternative is the continuance of our search for and utilization of external funding sources. This is however, a highly unpredictable area making planning difficult with no guarantee of additional funding.

## **Consequences if not Funded:**

See “Background and Justification” and “Life Cycle Cost (LCC) Analysis and Project Alternatives”

## **Operating Budget Impact:**

Lamar Community College has budget line items for recurring costs such as maintenance agreements and Software licensing. No overall increase in operating budget is expected as a result of this project.

## **Assumptions for Calculations:**

Please see included detail list of proposed expenditures.

## **Supplemental Justification (if necessary):**

N/A

<b>ADDITIONAL REQUEST INFORMATION</b>	
Date of project's most recent program plan:	
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes <input type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New <input type="checkbox"/> Renovation <input type="checkbox"/> Expansion <input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	_____ ASF _____ GSF
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?	

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
Classroom hardware upgrades/replacements – computers, multimedia equipment, computer tables	July 2016	June 2017
Server-Switch upgrades/replacements	July 2016	December 2016
Wireless upgrades/replacements	June 2016	December 2016
Office hardware upgrades/replacements – computers	July 2016	June 2017



July 1, 2015

Colorado Department of Higher Education  
1380 Lawrence, Suite 1200  
Denver, CO 80204

To Whom It May Concern:

Pursuant to CCHE program plan instructions, we are requesting a program plan waiver for the Technology Infrastructure Project. The estimated cost of the project is 644,400.00, which is below the \$2,000,000 threshold for program plans. The project is fairly straight forward and cost estimates were derived from analysis of the current technology market. We have handled projects similar in nature to this request and feel that we have the knowledge and background to fulfill program needs. There will be minimal increase in the operation and maintenance cost of this project.

I appreciate your consideration of the request. Feel free to give me a call if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Debono", written over a horizontal line.

Chad Debono  
Vice President of Administrative Services/  
Institutional Effectiveness  
719-336-1517  
[Chad.debono@lamarcc.edu](mailto:Chad.debono@lamarcc.edu)

**Form CC-P**

<b>Five-Year Capital Construction Program FY 2016-17 to FY 2020-21</b>				<b>Prepared By:</b>	Patrick Malott - Vice President of Administrative Services		
				<b>Phone:</b>	719-384-6823	<b>E-Mail:</b>	<a href="mailto:pat.malott@ojc.edu">pat.malott@ojc.edu</a>

<b>Agency or Institution:</b>	Otero Junior College					
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Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Technology Infrastructure	Capital Construction Funds	CCF	\$637,500	\$0	\$637,500	\$0	\$0	\$0	\$0
	1	Cash Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Purpose Code:</b>	F4	Reappropriated Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Gross Square Ft:</b>	n/a	Federal Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Project Type</b>	Total Funds	TF	\$637,500	\$0	\$637,500	\$0	\$0	\$0
<b>Renovation and Expansion</b>									

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Technology Infrastructure	Capital Construction Funds	CCF	\$550,000	\$0	\$0	\$550,000	\$0	\$0	\$0
	1	Cash Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Purpose Code:</b>	F4	Reappropriated Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Gross Square Ft:</b>	n/a	Federal Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Project Type</b>	Total Funds	TF	\$550,000	\$0	\$0	\$550,000	\$0	\$0
<b>New Construction</b>									

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Technology Infrastructure	Capital Construction Funds	CCF	\$600,000	\$0	\$0	\$0	\$600,000	\$0	\$0
	1	Cash Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Purpose Code:</b>	F4	Reappropriated Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Gross Square Ft:</b>	n/a	Federal Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Project Type</b>	Total Funds	TF	\$600,000	\$0	\$0	\$0	\$600,000	\$0
<b>New Construction</b>									

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Technology Infrastructure	Capital Construction Funds	CCF	\$650,000	\$0	\$0	\$0	\$0	\$650,000	\$0
	1	Cash Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Purpose Code:</b>	F4	Reappropriated Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Gross Square Ft:</b>	n/a	Federal Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Project Type</b>	Total Funds	TF	\$650,000	\$0	\$0	\$0	\$0	\$650,000

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Technology Infrastructure	Capital Construction Funds	CCF	\$700,000	\$0	\$0	\$0	\$0	\$0	\$700,000
	1	Cash Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Purpose Code:</b>	F4	Reappropriated Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Gross Square Ft:</b>	n/a	Federal Funds	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Project Type</b>	Total Funds	TF	\$700,000	\$0	\$0	\$0	\$0	\$0





**DEPARTMENT OF HIGHER EDUCATION  
OTERO JUNIOR COLLEGE**

John W. Hickenlooper  
Governor

*FY 2016-17 IT Capital Budget Request  
October 1, 2015*

James T. Rizzuto  
Executive Director

*J. Patrick Malachuk*  
Signature

7/7/2015  
Date

**Department or CCHE Capital Construction Priority: 1  
Technology Infrastructure II OJC**

Summary of Capital Construction Request	Total Funds	GF	Cash Funds*	Federal Funds
FY 2016-17	\$637,500	\$637,500	0	0
FY 2017-18	0	0	0	0
FY 2018-19	0	0	0	0

*\*For Higher Education institutions, please make a notation here if the institution is participating in the Intercept Program.*

**Request Summary:**

Otero Junior College is requesting \$637,500 to update and improve our technology infrastructure. We were fortunate during the 2015-2016 budget period the Legislative Joint Technology Committee recommended funding our request for \$818,950 for technology upgrades. The State Legislature approved the funding for this project and Otero Junior College thanks the Committee for their support. This budget period's request is primarily for upgrades to our storage area network (SAN), replacement of the core switch, and replacement of tele-presence units as improvements in technology provide the College additional quality in delivering distance education in our service area.

**Project Description:**

The Technology Infrastructure II Project will involve replacement of our storage area network (SAN). Otero Junior College's SAN is approximately 10 years old and, for the most part, performs well in storage and retrieval of a large amount of data generated by College students and staff. As with most technology, improvements in equipment and access to data constantly occur and it is necessary for the College to maintain our technology infrastructure to keep up with current developments. Software developments, effective access to internet capabilities, teaching delivery methods as well as student use of technology require the College to have the latest in equipment and infrastructure for us to provide outstanding instruction and educational opportunities for our students. We believe it is imperative we replace/upgrade our SAN in order to maintain a high level of performance in our data storage and retrieval system.

The core switch we currently are utilizing is also approximately 10 years old. This element of our technology infrastructure is the hub of our network system and basically "directs the traffic" as data flies around our network. Our concern is the age of this equipment and its ability to effectively continue to "manage" our network considering the additional demands we continually add to the network system in the

form of new software programs, newer technological devices requiring access, and the general significant increase in data that must be managed efficiently and effectively.

Over the last 5 years, Otero Junior College has put into operation a two-way, interactive audio/video course delivery system known as tele-presence. This system enables instructors to teach courses to those students physically present in the classroom as well as remote delivery to locations that have a tele-presence unit on site. The College presently has 3 tele-presence units on our Campus and we have placed units in High Schools in our service area that includes La Junta, Swink, Fowler, Ordway, Las Animas, Cheraw, Rocky Ford, and Manzanola. This network allows the Colleges to teach up to three courses at one time here on our Campus and simultaneously broadcast these courses to one or all of the locations that have a tele-presence unit. The units accommodate two-way audio so the instructor's comments are broadcast out and those students at each location can interactively ask questions with immediate feedback. Likewise, two-way video allows the remote students to view the instructor and any demonstrations that may take place in the classroom and the instructor can view the students at the remote sites. This method of course delivery enhances the opportunities for post-secondary education options and concurrent courses. Improvements in the tele-presence units are continually being made that improve the quality of audio, video, and overall performance. We anticipate the necessity to replace these units as technology advances so a part of this project request is to fund the purchase of new units.

### **Background and Justification:**

Our current storage area network (SAN) has been in service for approximately 10 years. It is important that we upgrade/replace this system in order to maintain reliability and provide timely, reliable, and accurate data storage and retrieval service to users of data devices associated with Otero Junior College.

Our core switch is aging out and its capacity to manage the network data becomes suspect as advances in hardware and software continue to pressure the College to provide the latest in technology in order to satisfy the needs of our students and staff.

Technological advances in the area of tele-presence have improved the quality of audio and video broadcasts as well as reliability of connections to remote units. These advances in technology will require the College to upgrade/replace units in the near future in order to maintain an optimum level of performance to deliver quality products to our students.

### **Implementation Plan**

The responsibility for implementation of the Technology Infrastructure II Project will be the Computer Center Staff at Otero Junior College and they will be supported by Colorado Community College System Information Technology staff as well as IT staff at individual Colleges within the Community College System. We anticipate vendors from whom we will purchase equipment will be available for consultation and installation support. The majority of the improvements and upgrades will be "behind the scenes" so end users will continue to operate the technology they use with very little interruption and training and enjoy faster, more reliable service.

### **Alignment with OIT Best Practices**

The Computer Center Director at Otero Junior College has been with us for 26 years and has close ties to the Colorado Community College System IT department as well as with other Colleges' IT staff throughout the System. We adhere to System IT policies and procedures to ensure compatibility with System wide connectivity and performance.

### **Cost Savings and Improved Performance Outcomes**

We anticipate immediate cost savings upon installation of certain equipment simply because we will have reliable back up data that is easily accessible and reliable. Power fluctuations/outages have resulted in the necessity to recover data and restore to memory via a process that has proven to be very labor intensive, time consuming, and, in some cases, loss of data has occurred. The cost associated with data loss is difficult to measure in dollars, however, it can be significant and cause undue hardship. The technology improvements that will come with completion of this project will improve the speed, accuracy, and efficiency of data flow which, in turn, should improve the efficiency and work performance of students and staff.

### **Security and Backup/Disaster Recovery**

This Project has as one of its priorities the replacement/upgrade of equipment and software relative to preservation of data under any circumstances.

### **Business Process Analysis**

The Project is designed to improve equipment performance due to technological advances in the area of data storage, processing, and accessibility. We believe our operational design is effective and efficient and we are looking to improve our business process via improved tools enabling our IT staff to become even more effective and efficient. Increased reliability, ease of access to data, and availability to access information will improve the efficiency and work product of students and staff.

### **Systems Integration Opportunities**

See “Alignment with OIT Best Practices” section.

### **Program Plan**

Request for waiver submitted with this request – Project total under \$2,000,000

### **Life Cycle Cost (LCC) Analysis and Project Alternatives**

Not Applicable

### **Consequences if not Funded:**

See “Background and Justification” section

### **Operating Budget Impact:**

Otero Junior College currently has budget line items for ongoing costs such as maintenance agreements, software licenses, and general recurring expenditures such as virus prevention software. We do not expect a material increase in these types of costs over and above normal inflationary increases that would occur as a result of completion of this project.

### **Assumptions for Calculations:**

Please see accompanying detail list of Project proposed expenditures.

**Supplemental Justification :** N/A

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<b>ADDITIONAL REQUEST INFORMATION</b>	
<b>Please indicate if three-year roll forward spending authority is required.</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Date of project's most recent Business Process Analysis:	N/A
Please provide the link to the Business Process Analysis or attached the first page of the analysis to this document:	N/A
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New <input type="checkbox"/> Renovation <input type="checkbox"/> Expansion <input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	<div style="display: flex; justify-content: space-around;"> <span>ASF</span> <span>GSF</span> </div>
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?	N/A

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
Storage Area Network Upgrade / Replacement	October 2016	March 2017
Tele-presence Unit Replacement / Upgrades	October 2016	June 2018



July 8, 2015

Colorado Department of Higher Education  
1380 Lawrence, Suite 1200  
Denver, CO 80204

To Whom It May Concern:

Pursuant to CCHE program plan instructions, we are requesting a program plan waiver for the Technology Infrastructure Project II. The estimated cost of the project is \$637,500.00, which is below the \$2,000,000.00 threshold for program plans. The project is pretty basic and cost estimates were derived from analysis of the current technology market. We have handled projects of this size and nature in the past and feel we have adequate knowledge to fulfill program needs without a program plan. We anticipate a slight increase to the operation and maintenance costs, but primarily due to normal inflationary adjustments.

I appreciate your consideration of the request. Feel free to give me a call if you have questions.

Sincerely,

A handwritten signature in black ink that reads 'L. Patrick Malott'.

L. Patrick Malott, CPA  
Vice President of Administrative Services

OTERO JUNIOR COLLEGE  
 CAPITAL CONSTRUCTION - INFORMATION TECHNOLOGY FUNDING REQUEST  
 FY 2016-2017

DESCRIPTION	QUANTITY	ESTIMATE UNIT COST	TOTAL ESTIMATED COST
STORAGE AREA NETWORK SYSTEM SAN MANUFACTURED BY "NUTANIX" REPLACE OUTDATED SYSTEM		\$	125,000
CORE SWITCH REPLACEMENT NEW CORE SWITCH - HEART OF NETWORK OPERATIONS		\$	250,000
DIGITAL SIGNAGE - DIRECTORY SYSTEM MONITOR & CONTROL SYSTEM UPGRADE CAMPUS SIGNAGE & DIRECTORIES		\$	17,500
TELEPRESENCE UNITS DISTANCE EDUCATION	15	\$ 15,000	\$ 225,000
CLASSROOM PROJECTORS Troxell E-Beam UPGRADE CLASSROOM TECHNOLOGY	20	\$ 1,000	<u>\$ 20,000</u>
TOTAL FUNDING REQUEST			<u><u>\$ 637,500</u></u>

**Form CC-P**

**Five-Year Capital Construction Program FY 2016-17 to FY 2021** Prepared By: Clifford Kitchen

Phone: 719-549-3291 E-Mail: [clifford.kitchen@pueblocc.edu](mailto:clifford.kitchen@pueblocc.edu)

Agency or Institution: Pueblo Community College

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Critical Core Technology Infrastructure	Capital Construction Funds	CCF	\$1,490,050	\$0	\$1,490,050	\$0	\$0	\$0	\$0
Priority: 1	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Purpose Code: F4	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gross Square Ft:	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Project Type	Total Funds	TF	\$1,490,050	\$0	\$1,490,050	\$0	\$0	\$0	\$0





# DEPARTMENT OF HIGHER EDUCATION PUEBLO COMMUNITY COLLEGE

John W. Hickenlooper  
Governor

*FY 2016-17 IT Capital Budget Request  
June 26, 2015*

[Name]  
Executive Director

Signature

6/16/15

Date

**Department or CCHE Capital Construction Priority: 1  
Critical Core Technology Infrastructure Project**

Summary of Capital Construction Request	Total Funds	GF	Cash Funds*	Federal Funds
<b>FY 2016-17</b>	<b>\$1,490,050</b>	\$1,490,050	\$0	\$0
<b>FY 2017-18</b>	<b>\$0</b>	\$0	\$0	\$0
<b>FY 2018-19</b>	<b>\$0</b>	\$0	\$0	\$0

*\*For Higher Education institutions, please make a notation here if the institution is participating in the Intercept Program.*

## Request Summary:

Pueblo Community College is requesting \$1,490,050 to replace and upgrade components of the core technology infrastructure serving the college. Critical infrastructure systems include both physical and virtual systems deemed vital to the operation of the college, the loss of which would have a debilitating impact on the ability of the college to continue to function. The continued and constantly increasing reliance due to disruptive innovation of ever changing technologies which are required to provide effective education for our students makes it imperative that PCC maintains and advances its technology base.

## Project Description:

The Core Infrastructure Technology Project will involve the replacement of existing systems that are at end of life with limited to no support and to upgrade systems that are at maximum capacity. Additionally, the need to be a borderless campus; supplying and supporting increased collaborative and online learning environments driven by the need to meet the continually changing demands of training for industry is driving our need to upgrade / replace systems (both physical and virtual). These upgrades / replacements are essential to meet the needs of students, faculty, and staff across all college departments effecting all four campus locations. With the continuous advent of aggressive changes in technology and educational need in the world, PCC needs to evolve and stay competitive to effectively educate our students. Core technologies to be replaced / upgraded include PCC's data storage and disaster recovery (data backup and recovery) technology, primary network switches, media delivery hardware, collaborative conferencing solutions, and network wireless technology.

Upon implementation the obsolete system components will be removed from service and be disposed of through the surplus property disposal / transfer process. The new technologies will be covered with appropriate licensing and maintenance agreements and all agreements will be updated to reflect changes in required technology to be covered.

This project is not part of any project appropriated in a previous year.

**Background and Justification:**

Every year PCC has diligently worked to utilize general and grant funds for the renewal and replacement of technology. With the vast advancement and changes in educational needs that have taken place in recent years, the use of technology of all types has become a required part of every curriculum at PCC. Due to the huge changes in educational and world culture requiring the need to significantly add to existing technologies and to incorporate new and additional technologies; our abilities to replace aging technology has been limited. Although we continue to replace a significant amount of technology each year from general and grant funds, a significant amount of the infrastructure technology that PCC requires for our base operations is at end of life / support. This means that these technologies can no longer be upgraded or maintained by support contract. In case of failure; PCC could see excessive downtime for part or all of the college.

The network switch technology that controls networking and communications systems in some of our buildings is reaching end of life and would be considered catastrophic should it fail, in that student and administrative systems would have the potential of being down for days or weeks if failure were to occur. Much of the technology that we will be replacing with this funding has a 10 to 15 year usable life and we are at the end of these spans. We are approaching the state of being at risk of permanently losing data due to antiquated backups using tape drive equipment and disk storage equipment that is at or approaching end of supportable life.

Many of our campus locations utilize various forms of video conferencing and collaborative learning technologies to instruct and to support remote students. The ability to have our faculty / staff reach out to them with collaborative learning techniques are key to their success and to our mission. By 2016 our current systems will be unable to accommodate this style of learning. Based on trends in the educational industry in accordance with our strategic plan we should be increasing the uses of this type of technology and at this time we are unable to move forward.

## **Implementation Plan**

The responsibility for sizing, quoting, ordering, and implementation of the Core Technology Project will be the Information Technology Services staff at Pueblo Community College. They will be supported by technology vendor consultation and pre-sales engineers from vendors where products are purchased working in conjunction with PCC IT Staff. The majority of the improvements and upgrades will be performed behind the scenes of the PCC students and staff. Products will be installed as part of upgrade / replacement windows with minimal to no downtime for the college. End-users will continue to operate with little to no downtime. In most cases they will start to see immediate improvements in performance and usability.

Planning will take place and will be communicated with management to avoid and eliminate unexpected outage or downtime. Upgraded and / or installation of equipment in the server room will typically be performed afterhours normal business hours and then schedules will be communicated for the rollout of any equipment that has direct impact on the end user.

## **Alignment with OIT Best Practices**

The Information Technology Department employees have many years of experience in the deployment and implementation of all the types of technology that will be purchased. The department also has close ties with all associated hardware vendors and with the Colorado Community College System IT Department and with other Colleges' IT staff throughout the system. PCC adheres to System IT policies and procedures to ensure compatibility with system wide upgrades, connectivity, and performance needs. These compatibility needs will be continued as part of this project.

## **Cost Savings and Improved Performance Outcomes**

We anticipate immediate soft cost savings upon installation of certain equipment because of significant performance increases due to faster and more reliable technology. Although hard to measure, the performance increases combined with efficiencies will improve the performance and educational capabilities for our students and staff. The major cost savings will be the ability to withstand and eliminate the huge costs associated with unplanned outages that will arise if we don't move forward with the replacement of these technologies. The costs and issues associated with having individual buildings or the entire campus down from hours to weeks due to not having parts could be monumental. We need to avoid this potential.

## **Security and Backup/Disaster Recovery**

All implementations that are part of this plan will be carefully planned moving forward in a systematic nature. If critical problems arise, in most cases the old technology can be temporarily placed back on line in a worst case scenario. All data related systems will be backed up and be proved capable of restoration prior to changing out systems. Support personal / contracts will be in place on all systems prior to moving forward with replacement. Training and knowledge will be in place for PCC's IT staff on all new systems prior to placing them in production.

## **Business Process Analysis**

Months of analysis and planning has been performed to identify and track systems that are to be replaced by this project. The project is designed to improve equipment performance due to technological advances in the area of storage, server processing, analytics, and security. Our staff as well as technical staff and engineers from various vendors have reviewed the technologies and associated plans. We fully believe we will be improving performance and reliability of all systems affected by this upgrade and that the updated

systems will provide a significantly increased level of reliability and performance thereby increasing productivity of students, faculty, and staff.

**Systems Integration Opportunities**

PCC adheres to System IT policies and procedures to ensure compatibility with system wide upgrades, connectivity, and performance needs. All systems that are installed are designed in such a way as to ensure interoperability with the technologies throughout the system due to stands based design and implementation.

**Program Plan**

Request for waiver submitted with this request – Project total under \$2,000,000

**Life Cycle Cost (LCC) Analysis and Project Alternatives**

Not applicable with this request. The project is being submitted because the components to be upgraded / replaced are at end of usable lifecycle.

**Consequences if not Funded:**

As discussed in the “Background and justification” section, if this project is not funded we will be at risk of not being able to replace critical core technologies in a timely fashion which could result in extended downtime. This would cause major disruptions in our abilities to hold effective classes for our students. Downtime could also cause major disruptions in our ability to perform administrative functions across all functional areas of the collage such as enrolling students, managing finances and general college administration, and etc.

**Operating Budget Impact:**

Pueblo Community College currently has budget line items for ongoing costs for the technologies discussed. These costs primarily include recurring maintenance agreements and support agreements. The technologies discussed do not necessarily include any significant additions that would increase our currently budgeted costs for ongoing maintenance and services. Based on review, PCC expects minimal increases above normal inflationary rates as a result of this project.

**Assumptions for Calculations:**

The following table provides estimation of costs based on price quotes, broken out by the type / classification of technology. .

ID	Technology	Qty	Estimated Total Cost
1	Core Network Switches / Associated Backup Power Various Models based on Building	1	\$741,700
2	Disk Storage Solutions	1	\$217,600
3	Network Wireless Solutions	125	\$165,000
4	Collaborative Conferencing Solutions	1	\$191,000
5	Servers (virtual / physical components)	7	\$174,750
Totals			\$1,490,050

1. Core Network Switches - Detailed as a single line item. The cost is comprised of multiple switches and associated components to include replacements / upgrades of various models of enterprise level switches to replace those that are going end of life. Switches are located in multiple campus / building locations across PCC along with associated power backup technologies. The switches comprising the line item cost are sized by the number of access points, computers, projectors, printers, telephones, and other devices that are connected to them.
2. Disk Storage - This solution is comprises the category of hardware used to store the electronic data for PCC, including storage for data for students, faculty, and staff. The electronic storage includes fault tolerant disk arrays and technologies to meet the needs of centralized data center storage.
3. Network Wireless Solutions – The predominate method of connectivity for PCC’s mobile technology brought on campus by our students and used for instruction is through wireless networks. Approximately 40% of our technology that provides wireless coverage needs replaced and / or upgraded in order to continue to provide comprehensive and adequate wireless access for our students and staff.
4. Collaborative Conferencing Solutions - One of the major initiatives and uses of classrooms for the future is the implementation and deployment of collaborative distance learning in the use of collaborative video and audio conferencing technologies to enable the connectivity to students between campus locations and from off the campus. The current bridge technology that controls the connectivity and provides the ability to connect multiple rooms and off campus locations into a single conference and associated technologies will be unsupported in the next year. The upgrades / replacement of this technology in order to provide for and increase our collaborative distance learning courses.
5. Servers (Virtual and Physical Components) – PCC manages and maintains multiple servers supporting the Instructional and Administrative networks. These servers support file and print, Internet Web sites, Security Systems, Video, Telephony, Learning Repositories and etc. Several of the server blade components for as well as physical servers will be unsupported and / or will not meet required performance specifications.

**Supplemental Justification (if necessary):**

Not Applicable

ADDITIONAL REQUEST INFORMATION	
<b>Please indicate if three-year roll forward spending authority is required.</b>	Yes <b>XX</b> No
Date of project’s most recent Business Process Analysis:	N/A
Please provide the link to the Business Process Analysis or attached the first page of the analysis to this document:	N/A
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes <b>XX</b> No
New construction or modification?	<input type="checkbox"/> New <input type="checkbox"/> Renovation

	<input type="checkbox"/> Expansion	<input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	_____ ASF	_____ GSF
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes	XX No
If this is a continuation project, what is the State Controller Project Number?	N/A	

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
Core Network Switches	August 2016	<b>April 2017</b>
Disk Storage	November 2016	<b>December 2016</b>
Student Wireless Solutions	November 2016	<b>May 2017</b>
Collaborative Conferencing Solutions	July 2016	<b>June 2017</b>
Servers (Virtual and Physical Components)	July 2016	<b>June 2017</b>



June 26, 2015

Colorado Department of Higher Education  
1380 Lawrence, Suite 1200  
Denver, CO 80204

To Whom It May Concern:

Pursuant to CDHE program plan instructions, we are requesting a program plan waiver for the Core Technology Infrastructure Project. The disruptive innovation of a continually changing technological environment has created shortfalls in the technology needs of our college. The college has been required to continually invest in improved technology while we have continuing demands and needs to update our technology infrastructure. Our students come to our campuses with the expectation to have a borderless access to technology using various types of devices utilizing a vast array of programs and software.

The estimated cost of the project is \$1,490,050 which is below the \$2,000,000 threshold for program plans. The cost estimates were derived from analysis and quote projects from the current technology market. The college has handled many projects of this size, scope, and nature but cannot keep pace with costs. We anticipate a slight increase to operation and maintenance costs, but this is primarily due to normal inflationary adjustments.

I appreciate your consideration of the request. Please feel free to give me a call if you have any questions equating this request.

Sincerely,

Jon Brude  
Chief Business Officer

**Pueblo Campus**  
900 W. Orman Ave.  
Pueblo, CO 81004  
719.549.3200

**Southwest Colorado Community College**  
701 Camino del Rio | Durango, CO 81301  
970.247.2929  
33057 Hwy. 160 | Mancos, CO 81328  
970.565.7496

**Fremont Campus**  
51320 W. Hwy. 50  
Cañon City, CO 81212  
719.296.6100

The Board of Governors of the  
Colorado State University System  
Meeting Date: August 7, 2015  
Action Item

MATTER FOR ACTION:

Approval of the Colorado State University - Pueblo Program Plan for Phase II of  
Information Technology Campus Access and Classroom Enhancements

RECOMMENDED ACTION:

MOVED, that the Board of Governors of the Colorado State University System approve  
Colorado State University – Pueblo’s Program Plan for Phase II of the Information  
Technology Campus Access and Classroom Enhancements.

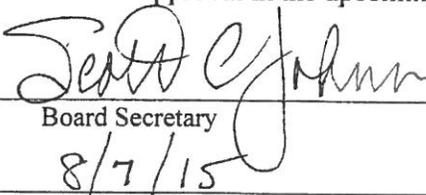
EXPLANATION:

Presented by Karl Spiecker, Vice President for Finance and Administration.

The University needs one-time assistance in the completion of upgrading antiquated voice and data networks by bringing on board sustainable cutting-edge technologies which will transform the institution with enhanced use of the Internet. This request if approved will enhance improvements funded in the FY 2015 legislative session. The additional bandwidth and access speed will allow modern workflow and on-line processes to be put into place. Additionally, the back-up Containerized Data Center will complement the Primary Containerized Data Center that was funded last year. Our plan would be to start work and ordering of necessary equipment and professional services immediately upon receiving these one-time funds. The goal would be the encumbrance of all state funds within six months of project approval, and completion of all aspects of project within three years. The total cost of the request is for \$3,944,430. The request for funding of the project was included in the Board Approved FY 2017 CSU System Capital Construction funding request to be considered for approval in the upcoming legislative session.

✓  
\_\_\_\_\_  
Approved

\_\_\_\_\_  
Denied

  
\_\_\_\_\_  
Board Secretary  
8/7/15  
\_\_\_\_\_  
Date

**Form CC-P**

<b>Five-Year Capital Construction Program FY 2016-17 to FY 2020-21</b>	<b>Prepared By:</b> Craig Cason	<b>Phone:</b> (719) 549-2211	<b>E-Mail:</b> <a href="mailto:craig.cason@colostate-pueblo.edu">craig.cason@colostate-pueblo.edu</a>
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<b>Agency or Institution:</b>	Colorado State University - Pueblo
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Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
IT Campus Access and Classroom Enhancements	Capital Construction Funds	CCF	\$3,944,430	\$0	\$3,944,430	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Purpose Code:	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0
	Gross Square Ft:	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0
	Project Type	Total Funds	TF	\$3,944,430	\$0	\$3,944,430	\$0	\$0	\$0

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
	Capital Construction Funds	CCF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Priority:	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0
	Purpose Code:	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0
	Gross Square Ft:	Total Funds	TF	\$0	\$0	\$0	\$0	\$0	\$0

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
	Capital Construction Funds	CCF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Purpose Code:	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0
	Gross Square Ft:	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0
	Project Type	Total Funds	TF	\$0	\$0	\$0	\$0	\$0	\$0

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
	Capital Construction Funds	CCF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Priority:	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0
	Purpose Code:	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0
	Gross Square Ft:	Total Funds	TF	\$0	\$0	\$0	\$0	\$0	\$0

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
	Capital Construction Funds	CCF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Priority:	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0
	Purpose Code:	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0
	Gross Square Ft:	Total Funds	TF	\$0	\$0	\$0	\$0	\$0	\$0

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2016-17	Year Two Request	Year Three Request	Year Four Request	Year Five Request
	Capital Construction Funds	CCF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Priority:	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0
	Purpose Code:	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0
	Gross Square Ft:	Total Funds	TF	\$0	\$0	\$0	\$0	\$0	\$0

CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17

Signature: *Paul J. Spang* Date: 8/7/2015  
 Signature: *Andrew J. Rauch* Date: 8/10/15  
 CCHE Approval: \_\_\_\_\_ Date: \_\_\_\_\_  
 OIT Approval: \_\_\_\_\_ Date: \_\_\_\_\_  
 OSPB Approval: \_\_\_\_\_ Date: \_\_\_\_\_

Agency or Institution:	CSU - Pueblo	Department or Institution Approval:							
Project Title:	Campus IT Upgrades and Security	Signature:							
Project Year(s):	FY 2016 - 2017	CCH Approval:							
Agency or Institution Priority Number:		OIT Approval:							
Program Plan:	Yes	OSPB Approval:							
		Name and e-mail address of preparer:	Mark Welte - mark.welte@csupueblo.edu						
Revision? Yes No		Total Project Costs	Total Prior Year Appropriations	Current Request FY 2016-17	Year 2 Request	Year 3 Request	Year 4 Request	Year 5 Request	
A. Land Acquisition									
(1) Land/Building Acquisition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
B. Contract Professional Services									
(1) Consultants/Contractors	\$ 140,000	\$ -	\$ 140,000	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) Quality Assurance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(3) Independent Verification and Validation (IV&V)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4) Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(5) Leased Space (Temporary)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(6) Feasibility Study	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(7a) Inflation for Professional Services	\$ 10,000	\$ -	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -	
(7b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
(8) Other Services/Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(9) Total Professional Services	\$ 150,000	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ -	\$ -	
C. Associated Building Construction									
(1) (a) New (GSF):	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
New \$ /GSF									
(b) Renovate GSF:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) Renovate \$ /GSF									
(3) Site Work/Landscaping	\$ 300,000	\$ -	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ -	
(4) Other (Specify)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(5a) Inflation for Construction	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(5b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
(6) Total Construction Costs	\$ 300,000	\$ -	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ -	
D. Software Acquisition									
(1) Software COTS	\$ 583,600	\$ -	\$ 583,600	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) Software Built	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4a) Inflation on Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
(5) Total Software	\$ 583,600	\$ -	\$ 583,600	\$ -	\$ -	\$ -	\$ -	\$ -	
E. Equipment									
(1) Servers	\$ 287,500	\$ -	\$ 287,500	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) PCs, Laptops, Terminals, PDAs	\$ 499,000	\$ -	\$ 499,000	\$ -	\$ -	\$ -	\$ -	\$ -	
(3) Printers, Scanners, Peripherals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4) Network Equipment/Cabling	\$ 1,806,500	\$ -	\$ 1,806,500	\$ -	\$ -	\$ -	\$ -	\$ -	
(5) Other (Specify)	\$ 130,000	\$ -	\$ 130,000	\$ -	\$ -	\$ -	\$ -	\$ -	
(6) Miscellaneous	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(7) Total Equipment and Miscellaneous Costs	\$ 2,723,000	\$ -	\$ 2,723,000	\$ -	\$ -	\$ -	\$ -	\$ -	
F. Operating Cost									
(1) Maintenance Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) Repair Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(3) Staffing/Employee Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(4) Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(5) Total Operating Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
G Total Project Costs	\$ 3,756,600	\$ -	\$ 3,756,600	\$ -	\$ -	\$ -	\$ -	\$ -	
H. Project Contingency									
(1) 5% for New	\$ 187,830	\$ -	\$ 187,830	\$ -	\$ -	\$ -	\$ -	\$ -	
(2) 10% for Renovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
(3) Total Contingency	\$ 187,830	\$ -	\$ 187,830	\$ -	\$ -	\$ -	\$ -	\$ -	
I. Total Budget Request (F+G(3))	\$ 3,944,430	\$ -	\$ 3,944,430	\$ -	\$ -	\$ -	\$ -	\$ -	
J. Source of Funds									
GF	\$ 3,944,430	\$ -	\$ 3,944,430	\$ -	\$ -	\$ -	\$ -	\$ -	
CF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
RF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
FF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

check (should = H)

\$3,944,430

\$0

\$3,944,430

\$0

\$0

\$0

\$0



# COLORADO

John W. Hickenlooper  
Governor

Erich Matola  
Chief Information Officer

FY 2016-17 Capital IT Request | July 24, 2015

Signature

Date

*Department or CCHE Capital Construction Priority: xx  
Colorado State University - Pueblo Campus Information Technology Upgrades and Security*

Summary of Capital Construction Request	Total Funds	CCFE	Cash Funds*	Federal Funds
FY 2016-17	\$3,944,430	\$3,944,430	\$0	\$0

## Request Summary

The project request is to upgrade critical technological systems at CSU-Pueblo's campus. This is in order to address the increasing technology demands, alignment with OIT and DHE best practices, and the requirements of teaching in the quickly changing technological world. This includes providing an additional redundant datacenter, security technology to protect the campus, upgrading classrooms from analog to digital "smart" technology, integrating a new unified messaging system throughout campus, and a fiber truck to repair the infrastructure. The total request is for \$3,944,430.

## Project Description

In order to adequately support the increasing and changing technological needs on the campus, Colorado State University – Pueblo is requesting the following upgrades:

### New Redundant Containerized Datacenter

The request includes installing one (1) new containerized datacenter to provide a redundant site for failover and disaster recovery. A containerized datacenter is a purpose-engineered module designed to provide a self-contained environment for housing servers and other critical computer hardware. The unit includes lighting, fire suppression, monitoring, power distribution, and critical cooling. It is a standalone unit and does not need to be contained within an existing building. CSU-Pueblo is currently installing the primary containerized unit on campus.

### Campus Network and System Security

The network and system security is a collection of tools and monitoring systems that proactively monitor and log data entering into and out of the campus network. The campus security systems are directed by The Critical Security Controls for Effective Cyber Defense set forth by the Council on CyberSecurity which is the security program that the OIT follows. The security system looks for patterns of suspicions or malicious activity and records machine data for analysis and logging. The systems provide secure connections to vital

resources such as DNS and encrypted traffic while at the same time inspecting the traffic for hackers attempting to steal data or phish personal information.

#### Provide Digital Technology to all Classrooms

Digital Classrooms are technology enhanced classrooms that provide opportunities in the classroom by integrating learning technology, such as computers, specialized software, audience response technology, assistive listening devices, networking, and audio/visual capabilities. The Digital classrooms are equipped with ceiling mounted projectors and projection screen, laptop / desktop connectivity, enhanced sound system, touchscreen control system, telecommunications, and video recording capabilities.

#### Integrate Unified Messaging Throughout Campus

A Unified Messaging system integrates traditional telephone systems with communications media (e-mail, fax, video messaging, etc.) technologies into a single interface, accessible from a variety of different devices. Unified messaging solutions enhance and improve business productivity while decreasing communication issues. It also reduces the need to travel for communication and extends the campus out to other geographic areas not limited to Pueblo.

#### Purchase New Fiber Truck

CSU-Pueblo is responsible for maintaining the CDOT fiber in southern Colorado as part of an MOU for using the fiber. The current splicing truck is over 20 years old, and is in need of replacement with a new and more reliable unit. The truck and equipment it contains is constantly in demand for campus telecommunications and fiber optic splicing needs for both emergency and non-emergency situations. The truck is required as higher education is allowed to use the fiber owned by the Colorado Department of Transportation in exchange for maintenance and repair of that fiber.

No part of this project request is a continuation project from any other request.

### **Background and Justification**

#### New Redundant Containerized Datacenter

The CSU-Pueblo datacenter was constructed when mainframes were the primary computing system used on the campus. The campus suffered from an extended outage in 2012 during the Spring finals as there was no provision for disaster failover when an equipment failure happened in the primary datacenter. This resulted in the complete loss of campus computing for seven (7) days and caused significant disruptions to the campus operations.

The campus is in the process of installing a new primary containerized datacenter to replace the aging datacenter facilities. There is not an adequate secondary datacenter that allows for a complete failover for maintenance or disaster recovery. Audits conducted by both CSU- Ft Collins and by outside IT specialists following the 2012 outage concluded that the CSU-Pueblo campus did not have adequate computing infrastructure to provide continuous computing service in case of an issue in the primary datacenter.

This project would provide a mirror image of the primary containerized datacenter in a geographically different location on campus to provide failover and disaster recovery in case of an issue in the primary datacenter. Existing equipment would be split between the primary and redundant datacenters to provide a 1+1 system for operation. No new networking or server systems would need to be purchased as the current systems were designed with this configuration as the intended configuration.

### Campus Network and System Security

Students, staff and faculty are connected to more systems outside of CSU-Pueblo than ever before. But with this connectivity comes the increased threat of data breaches and the loss of personal information as the systems that are required to conduct day to day operations are also connected to the outside world. The ever increasing threats from hackers and cybercriminals are requiring robust information security programs and tools to combat the threats. The OIT's Office of Information Security has provided guidance and leadership in combating these threats and CSU-Pueblo is striving to model their information security plan after the OIT's Office of Information Security security plans.

The campus network and system security upgrade is to install systems and tools that follow The Critical Security Controls for Effective Cyber Defense set forth by the Council on CyberSecurity (Otherwise known as the CSC 20 rules). This is the security framework that the OIT's Office of Information Security has been successful in implementing to minimize the threats present in today's information technology landscape.

The first upgrade would be software and systems that allow the Critical Security Control Rule 11: Limitation and Control of Network Ports, Protocols, and Services to be implemented. This is the limiting of ports, protocols, and services with validated business needs and host-based firewalls or port filtering tools on end systems. The main tool in this area would be secure DNS servers to prevent man in the middle attacks and network analysis tools to inspect traffic in real time for malicious activity and port spoofing.

The next area would be to cover Critical Security Control Rule 14: Maintenance, Monitoring, and Analysis of Audit Logs. This would be software to aggregate machine data and analyze and identify anomalies in logs. This software is known as Security Incident and Event Management software (SEIM) or log analytic tools for log aggregation and consolidation from multiple machines and for log correlation and analysis.

The final area that would be covered in this upgrade would be to tools and software to cover CSC Rule 3: Secure Configurations for Hardware and Software on Mobile Devices, Laptops, Workstations, and Servers and CSC 4: Continuous Vulnerability Assessment and Remediation. At present the CSU-Pueblo campus does not have any way to quickly and effectively audit the security position of the campus and these tools would allow the requirements of the above rules to be met.

### Provide Digital Technology to all Classrooms

CSU-Pueblo has 130 classrooms that are outfitted with a desktop computer, an analog controller, and at least 1 projector. The initiative would be to upgrade the teaching podiums to a standard digital system that would allow the use of devices independent of the manufacture and thus allow, faculty, students, and guest speakers to present and interact with students in the classroom. Additionally select classrooms would be upgraded to video telepresence enabled classrooms that would allow content to be streamed into or out of the classroom for distance learning and collaboration.

At present time the systems are connected via analog connections and do not support new technology such as iPads, Apple computers, or other digital inputs. Presentations and teaching must either be conducted via whiteboards in the classroom or via the computer in slides and presentations. This initiative would upgrade all of the classrooms to digital media connections that would allow the faculty and staff to connect to the classroom audio and video equipment via multiple digital sources. Requests are ever increasing from both faculty and students that new teaching methods such as hybrid classes or experiential teaching and thus this is difficult to accomplish as the current classrooms do not support the technology required to teach the classes.

### Unified Messaging Implementation across Campus

The unified messaging initiative is to replace separate and end of life equipment with a single communication system that allows end users the ability to interact via voice, video, and instant messaging from a common system that is available on a variety of devices. The current communication systems at CSU-Pueblo is a traditional PBX phone system, Microsoft Exchange for email, and various standalone implementations on video teleconferencing. The Fujitsu XL 9600 PBX phone system is 15 years old and is not VoIP capable. In, addition, it has not been supported by the manufacturer for over five years. Parts and spares are difficult to obtain and reliable operation of the system is at risk if critical components need to be replaced. The implementation of a unified communication system will reduce long distance costs by its use of the campus WAN connection to the outside world. It will also improve video teleconferencing capability on campus via the use of the University's LAN.

### Purchase New Fiber Truck

This initiative it to purchase a truck to replace that aging truck used for fiber optic repairs and splices which connects the CSU-Pueblo campus to the rest of the state. Currently there are only two (2) fiber optic repair vehicles in the state of Colorado and they are located at the CSU-Pueblo campus and the CSU-Ft Collins campus. CSU-Pueblo has a memorandum of understanding with CDOT that we are allowed to use the CDOT fiber for our internet traffic in exchange for splice and repair work for CDOT on the lines. The CSU-Pueblo splice truck provides fiber repair and new connections for UC-Colorado Springs, CSU-Pueblo, Colorado School of Mines, CDOT, UCAR and the FRGP.

### **Implementation Plan**

#### New Redundant Containerized Datacenter

The implementation plan is to hire an architect to work with a datacenter design firm to create the project drawings and scope. The project will include a concrete floor slab to house the datacenter as well as electrical connections to the existing power supply and generator currently on campus. The datacenter will be custom built off-campus and delivered to campus upon completion.

The project timeline to complete the datacenter project is nine (9) months. This will include three (3) months to hire an architect and design the project, and six (6) months to have the data center constructed and installed.

#### Campus Network and System Security

The implementation plan is to work with the OIT Office on Information Security to make sure that the policies and tools that CSU-Pueblo is installing work in conjunction and do not disrupt any services provided by the OIT.

The project timeline to complete the security project is twenty four (24) months. This will include three (3) months to work with the OIT and vendors on a project design, and eighteen (18) months to training, deployment, and documentation of the software and procedures.

#### Provide Digital Technology to all Classrooms

The project timeline to complete the digital upgrade project is twelve (12) months. This will include three (3) months to work with vendors on a project specifications and procurement, and nine (9) months for installation, deployment, documentation and training.

The timing will be done so to minimize disruptions to class and to upgrade the classrooms that have the largest impact with regards to instruction.

#### Unified Messaging Implementation across Campus

The implementation plan is to engage with a unified messaging specialist to determine the project requirements, implementation time and scope. The implementation will be staged as to not disrupt the business operations or communications on the campus

The project timeline to complete the datacenter project is twelve (12) months. This will include three (3) months to hire a project specialist and design the project, and nine (9) months for installation, deployment, documentation and training.

#### Purchase New Fiber Truck

The project implementation time is three (3) months for the purchase and outfitting of a new fiber splice truck. This includes procurement, configuration, and delivery

#### **Alignment with OIT Best Practices**

The information technology and security upgrades requested in this document align with the strategies and policies of the OIT. The requests are to better align CSU-Pueblo with the guidelines set forth in the OIT's FY2016 Playbook which outlines the OIT's strategic plan as well as the OIT Office of Information Security's Secure Colorado strategic plan. CSU-Pueblo is intent on working with the OIT to make sure that the IT polices of the campus follow the IT policies of the OIT. The OIT follows the by The Critical Security Controls for Effective Cyber Defense and CSU-Pueblo will follow that same security guidelines for all new technology projects

#### **Security and Backup/Disaster Recovery**

##### New Redundant Containerized Datacenter

Security and backup/disaster recovery capabilities will be enhanced by the installation of the new redundant containerized datacenter. It will provide the necessary cooling for the equipment as well as electrical connectivity to the emergency generator in case of power outages and/or surges. The container will be monitored by closed circuit cameras and will have environmental and security monitors to indicate when conditions are outside of the specified requirements. This will provide a second fully operational datacenter to the campus that will be able to take over the entire campus operations of computing in case of a failure of the primary containerized datacenter.

##### Campus Network and System Security

The campus network and system security upgrade is to install systems and tools that follow The Critical Security Controls for Effective Cyber Defense set forth by the Council on CyberSecurity. This is the security framework that the OIT's Office of Information Security has been successful in implementing to minimize the threats present in today's information technology landscape.

##### Provide Digital Technology to all Classrooms

Security and disaster recovery would be provided by existing IT systems.

##### Unified Messaging Implementation across Campus

Security and disaster recovery would be provided by existing IT systems. As this is a new system the implementation and configuration would be done to closely follow the security guidelines set forth in The Critical Security Controls for Effective Cyber Defense.

### Purchase New Fiber Truck

Truck will be stored on campus in a secure area.

### **Business Process Analysis**

CSU-Pueblo recognized the previous work with the Joint Technology Committee and the importance of the JTC to the success of the campus. The JTC provided the campus the ability to correct serious technological problems and thus continue to move the campus forward with its strategies.

For the FY 2016-2017 project request CSU-Pueblo started with evaluating the systems that had the greatest impact on the technological infrastructure and could potentially cause:

1. prolonged business outages or loss of system use
2. monetary losses due to failure, data breach, or other factor
3. strategic goals set forth by the state, campus, the CSU-System, the OIT, or the CHDE

The systems determined to be critical were evaluated against these factors and a list was compiled based upon the need, the cost of the need, and the alignment with strategies of the stakeholders of the systems. Campus leadership and stakeholders within information technology then developed this request to either correct these deficiencies or to upgrade equipment to allow the university to meet the needs expected from the various stakeholders that CSU-Pueblo is responsible to. The report was then developed to submit to the JTC for consideration in the FY2016-2017.

### **Systems Integration Opportunities**

CSU-Pueblo is working with the OIT to identify areas that may be system integration opportunities with regards to network security and auditing.

### **Program Plan**

The program plan has been created and verified by an independent third party for accuracy. The program plan was submitted to the CSU Board of Governors for review and prioritization.

### **Cost Savings and Improved Performance Outcomes**

#### New Redundant Containerized Datacenter

The redundant containerized datacenter will decrease network downtime, prolong equipment life, and provide real time backup and disaster recovery. The redundant containerized datacenter will provide redundant cooling, redundant power, and a significant reduction to hazards such as flooding as it is not housed within a building envelope.

Cost calculations in prioritizing the redundant data center were made using the campus operating budget with a 24/7 operating time. The campus has an operating budget of approximately \$45 million and therefore each minute of downtime on the campus has the theoretical cost \$85.60. This equates to \$5136.98 per hour or \$123,287.52 per day. The cost justification for the redundant datacenter is based on cost avoidance due to lost productivity and the loss of instructional time.

#### Campus Network and System Security

The network and security system is based completely on cost avoidance. A security industry report determined that a security breach is three (3) times more expensive than the security controls that would have prevented it. Recent high profile breaches such a Target, Anthem and the multitude of others has shifted the focus of the campus to protect the information of its customers, employees, and stakeholders.

This project is to align with the OIT Office of Information Security's goal to have all new systems evaluated and monitored in real time.

#### Provide Digital Technology to all Classrooms

This project is based on improved performance outcomes. Changes in technology have altered the delivery of information to students as they no longer have to be in the classroom to receive instruction and more and more of the instructional delivery is by video or other digital content. The upgrade of the classrooms to digital technology is so that CSU-Pueblo can produce students the experience and qualifications required by employers in the state of Colorado. This will allow the classrooms at CSU-Pueblo be used for hybrid teaching, distance learning, and device independent content delivery.

#### Unified Messaging Implementation across Campus

The unified messaging system implementation is to reduce the need for travel, increase the availability of messaging to multiple devices, and provide a single system to aggregate that various forms of communication that are present in the operation of the campus. Current voice systems are limited to be accessed from one device and are not mobile ready. The unified messaging system would allow messaging to be received from a number of devices as well as extend the messaging delivery to geographic areas outside of the CSU-Pueblo campus.

#### Purchase New Fiber Truck

The current fiber truck is a 20 year old converted ambulance and is not part of the state fleet program. The truck is not set up for winter use and can be difficult to operate in cold weather. The new fiber truck would be specified and built for fiber optic repair as well as be configured for working safely in the areas containing high volumes of traffic and environmental issues.

### **Cost-Benefit Analysis and Project Alternatives**

#### New Redundant Containerized Datacenter

One alternative to the proposed redundant datacenter would be to reuse the current out of date datacenter in the Administration Building, The Heating, Ventilation, and Air Conditioning System (HVAC) to handle the necessary loads has been quoted at \$400,000 to only upgrade the existing cooling system. Reuse of the existing datacenter would be expensive as the datacenter would still need additional work to the electrical system, the raised floor system, and flood mitigation work to protect the existing datacenter from internal plumbing. This was deemed to be not an efficient option as the building is not configured to handle the new equipment and would be more expensive to retrofit when compared to a modular system.

Movement to the cloud of campus systems was also researched. The campus is moving non-essential computing activities to the cloud but the redundant datacenter would still be needed to house the networking, firewalls, and servers that would be needed to connect to the cloud systems.

Not funding the redundant modular datacenter would significantly increase the probability of another major outage on campus. The lack of a redundant datacenter has been determined to be an issue in previous audits and this would provide a mirror to the primary datacenter.

#### Campus Network and System Security

There were no alternatives to this project other than to continue on with the current systems which are known to be inadequate. This program is a cost avoidance issue and also contains the intangibles of damage to the credibility of CSU-Pueblo.

### Provide Digital Technology to all Classrooms

One of the alternatives reviewed was to not offer the enhanced learning experience of smart classrooms, and using more traditional non-internet and technology based teaching. Over the past couple of years there has been an increase in the number of instructors wanting to teach hybrid classes and those that did had difficulties in doing so as the classrooms are not equipped to support that type of instruction. Other alternatives such as complete online learning have been explored but research by Rutgers and other universities have shown that a mixture of digital delivery and face to face interaction has been shown to be preferred by both faculty and staff.

### Unified Messaging Implementation across Campus

The options that were reviewed were to continue to use the existing systems and attempt to obtain replacement parts or look to using a third party or hosted solution for VoIP telephone service. Typical hosted messaging solutions cost approximately \$10 per subscriber line and the system is subject to the availability of the internet as that is how it is delivered. CSU-Pueblo looked at what other state agencies have done such as the Colorado Department of Transportation and the savings that they have reported in travel costs and messaging costs determined that the unified messaging was the best choice.

### Purchase New Fiber Truck

The alternative to purchasing a new fiber truck was to contract out to have the work performed. The average cost for a vendor to perform a splice or repair is \$2500. On average the fiber truck is used four (4) times per month. Performing the calculations of having a vendor perform the splice and repair work shows that the campus could expect to pay about \$120,000 per year for fiber repair. This would increase the cost to the university as this would have to be paid for with operating budgets. Based on the amount the truck would be used the ROI on the truck would be two (2) years.

### **Consequences if not Funded**

#### New Redundant Containerized Datacenter

This would leave the campus with one datacenter and thus it would still be susceptible to a failure like the one that occurred in 2012. As stated before in this document the existing datacenter is not able to handle what is currently in it and using it as a backup would require a significant amount of expenditure. The other significant issue facing the campus is that the IT resources are expected to behave as a utility and should be available 24/7. This is not currently possible with the existing systems.

#### Campus Network and System Security

The consequences of not placing resources into security are the loss of confidence in the customers and the cost of remediating the damage from a breach. Unfortunately there are significant financial gains for the hackers and cybercriminals so this threat will be persistent and only get more complex as the resources of the hackers get better.

### Provide Digital Technology to all Classrooms

Not funding the digital equipment upgrades will prevent the university from taking advantage of 21st century technology. Faculty, staff, and students all have an increased reliance on technology in terms of availability, confidentiality, and integrity. Upgrading these components will allow all university constituents to work more efficiently and also help attract and retain students to campus. Higher education has become a very competitive market and any decreases in enrollment will have a significant impact on the financial stability of the campus.

### Unified Messaging Implementation across Campus

The campus is already behind many other state institutions with regards to messaging and technology and this would put the campus further behind. CSU-Pueblo is one of the last campuses to still use a PBX phone system and thus is not able to take advantage of many of the features and efficiencies that unified communications provides.

### Purchase New Fiber Truck

The ability to repair the fiber for CDOT in the southern part of the state is part of an agreement between higher education and the CDOT for the use of the fiber optic lines to connect campuses across the state. The inability to repair the fiber would require CSU-Pueblo to contract out the work at a much higher expense and with a longer time to repair.

### **Operating Budget Impact**

#### New Redundant Containerized Datacenter

The redundant containerized datacenter is not expected to impact the campus IT operating budget for the first five (5) years of operations as maintenance and support have been included in the purchase price of the equipment and will be for a 5 year period. The other main area that would be impacted on campus would be to the electrical expenses of the campus and this has been calculated to be less than what the current datacenter uses as the systems are designed to be scalable. The electrical load and cooling load only use the resources that are in need at the given computing load. This has been shown to have as much as a 20% saving in electrical usage over the current datacenter in use on campus.

#### Campus Network and System Security

There is expected to be an increase in the operating budget for security but this has been determined to be independent of this project. The increase in threats to the campus requires an increase in security spending.

#### Provide Digital Technology to all Classrooms

This project will not impact the current operating budget of the campus for the first five (5) years and all maintenance and support will be included in the purchase of the equipment. There is not expected to be an increase in FTE due to this project.

#### Unified Messaging Implementation across Campus

This project will not impact the current operating budget of the campus for the first five (5) years and all maintenance and support will be included in the purchase of the equipment. There is not expected to be an increase in FTE due to this project.

#### Purchase New Fiber Truck

This project will not impact the current operating budget as it will replace an ageing piece of equipment.

**Assumptions for Calculations:**

All purchases will include five (5) years of maintenance and support.

<u>New Redundant Containerized Datacenter</u>	
Containerized Datacenter	\$625,000
Datacenter Architectural & Engineering	\$50,000
Structural Concrete Pad	\$75,000
Electrical / Network Datacenter Connectivity	\$150,000
Campus Exterior Improvements	\$75,000
Training	\$10,000
Project Cost	\$985,000
<u>Campus Network and System Security</u>	
Security Software	\$305,000
Training and Implementation	\$50,000
Project Cost	\$355,000
<u>Provide Digital Technology to all Classrooms</u>	
130 classrooms to upgrade	
Digital cabling 130 rooms	\$195,000
Digital equipment, media, audio video 130 rooms	\$1,189,500
Project Cost	\$1,384,500
<u>Unified Messaging Implementation across Campus</u>	
Software and licensing	\$288,600
Servers, storage, peripherals	\$427,500
Life safety power backup	\$96,000
Implementation	\$90,000
Project Cost	\$902,100
<u>Purchase New Fiber Truck</u>	
Fiber splice truck	\$130,000
Total All Project Costs	\$3,756,600
Contingency = 5% x \$3,756,600	\$187,830
<b>Total CC-IT Request</b>	<b>\$3,944,430</b>

<b>ADDITIONAL REQUEST INFORMATION</b>		
<b>Please indicate if three-year roll forward spending authority is required.</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Date of project's most recent program plan:	8-1-2015	
Please provide the link to the program plan or attached the first page of the analysis to this document:		
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New	<input type="checkbox"/> Renovation
	<input type="checkbox"/> Expansion	<input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	_____ ASF	_____ GSF
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?		

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>

# Program Plan Colorado State University – Pueblo Information Technology Campus Access and Classroom Enhancements

*FY 2016-2017 Capital Budget Request – August 1, 2015*



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**Summary**

## PREFACE

Higher education decision makers are eyeing ways to better understand, plan for, and execute around the technology trends that will impact their organizations both today and in the future. IT is the strategic vehicle in which many of these business or educational needs are satisfied. The increasing use of computer technology in the classroom and for distance learning has gained broad acceptance at Colorado State University – Pueblo. Multimedia access over the network has become an instructional need as the use of the Internet has grown to provide important educational resources. New academic uses of technology are putting demands on campus infrastructures that those systems were not designed to support. Our administrators, faculty, staff, and students expect the University’s IT systems to be like other utilities...always available. This level of service requires our systems to be built using high reliability and redundant techniques. Colorado State University - Pueblo is committed to providing such “always on” services.

This plan strives to support the CSU-Pueblo Strategic Plan and its many goals. Additionally, Colorado Department of Higher Education and State goals have been taken into consideration and are addressed by this program plan. Fulfilling needs such as full access to network resources specifically for Southern Colorado is an ongoing goal as well the enhancement of classrooms and the learning experience. As a Hispanic Serving Institution (HSI), CSU-P’s role as a means to promote opportunities for our students in Colorado is vital. New infrastructure addresses digital library requirements, electronic student services, security, as well as the support of larger outreach and distance learning needs all urgently required by our workforce.

## **PROBLEM STATEMENT**

Colorado State University – Pueblo has an aging data and voice infrastructure and increasing demands from its constituents to provide “always on” access to the internet and to internal and external data sources. The students, faculty and staff at CSU-P are challenged to thrive in a digital world with tools and systems that are often 10, 15 or even 20 years old. In many instances this antiquated technology has impacted enrollment, administrative efficiencies and even the ability to compete. The University is tasked with feeding qualified future employees and professionals into Colorado’s dynamic and technologically savvy workforce. Satisfying the needs outlined in detail in this Program Plan fully addresses the requirements for student access to the internet, modern computers and software, network and system security, technology enhanced classrooms, electronic student services, and digital library resources. Additionally, the increased bandwidth and throughput capabilities will allow for community outreach and distance learning, ultimately supporting and adapting to the quickly changing workforce needs of Colorado. For this purpose we have the following initiatives.

Initiative #1 – New Redundant Containerized Datacenter

Initiative #2 – Campus Network and System Security

Initiative #3 – Provide Digital Technology to all Classrooms

Initiative #4 – Integrate Unified Messaging Throughout Campus

Initiative #5 – Purchase New Fiber Truck

The University needs one-time assistance in the completion of upgrading these antiquated voice and data networks by bringing on board sustainable cutting-edge technologies which will transform the institution with enhanced use of the Internet. This request if approved will enhance improvements funded in the FY 2015 legislative session. The additional bandwidth and access speed will allow modern workflow and on-line processes to be put into place. Additionally, the back-up Containerized Data Center will complement the Primary Containerized Data Center that was funded last year. Our plan would be to start work and ordering of necessary equipment and professional services immediately upon receiving these one-time funds. The goal would be the encumbrance of all state funds within six months of project approval, and completion of all aspects of project within three years.

## PROJECT DETAIL

### **Initiative #1 – Install New Containerized Datacenter**

#### **Project Description**

The request includes installing one (1) new containerized datacenter to provide a redundant site for failover and disaster recovery. A containerized datacenter is a purpose-engineered module designed to provide a self-contained environment for housing servers and other critical computer hardware. The unit includes lighting, fire suppression, monitoring, power distribution, and critical cooling. It is a standalone unit and does not need to be contained within an existing building. CSU-Pueblo is currently installing the primary containerized unit on campus.

#### **Background and Justification**

The CSU-Pueblo datacenter was constructed when mainframes were the primary computing system used on the campus. The campus suffered from an extended outage in 2012 during the Spring finals as there was no provision for disaster failover when an equipment failure happened in the primary datacenter. This resulted in the complete loss of campus computing for seven (7) days and caused significant disruptions to the campus operations.

The campus is in the process of installing a new primary containerized datacenter to replace the aging datacenter facilities. There is not an adequate secondary datacenter that allows for a complete failover for maintenance or disaster recovery. Audits conducted by both CSU- Ft Collins and by outside IT specialists following the 2012 outage concluded that the CSU-Pueblo campus did not have adequate computing infrastructure to provide continuous computing service in case of an issue in the primary datacenter.

This project would provide a mirror image of the primary containerized datacenter in a geographically different location on campus to provide failover and disaster recovery in case of an issue in the primary datacenter. Existing equipment would be split between the primary and redundant datacenters to provide a 1+1 system for operation. No new networking or server systems would need to be purchased as the current systems were designed with this configuration as the intended configuration.

#### **Cost-Benefit Analysis and Project Alternatives**

One alternative to the proposed redundant datacenter would be to reuse the current out of date datacenter in the Administration Building, The Heating, Ventilation, and Air Conditioning System (HVAC) to handle the necessary loads has been quoted at \$400,000 to only upgrade the existing cooling system.

Reuse of the existing datacenter would be expensive as the datacenter would still need additional work to the electrical system, the raised floor system, and flood mitigation work to protect the existing datacenter from internal plumbing. This was deemed to be not an efficient option as the building is not configured to handle the new equipment and would be more expensive to retrofit when compared to a modular system.

Movement to the cloud of campus systems was also researched. The campus is moving non-essential computing activities to the cloud but the redundant datacenter would still be needed to house the networking, firewalls, and servers that would be need to connect to the cloud systems.

Not funding the redundant modular datacenter would significantly increase the probability of another major outage on campus. The lack of a redundant datacenter has been determined to be an issue in previous audit and this would provide a mirror to the primary datacenter.

### **Consequences if not Funded**

This would leave the campus with one datacenter and thus it would still be susceptible to a failure like the one that occurred in 2012. As stated before in this document the existing datacenter is not able to handle what is currently in it and using a backup would require a significant amount of expenditure. The other significant issue facing the campus is that the IT resources are expected to behave as a utility and should be available 24/7. This is not currently possible with the existing systems.

### **Assumptions for Calculations**

Containerized Datacenter	\$625,000
Datacenter Architectural & Engineering	\$50,000
Structural Concrete Pad	\$75,000
Electrical / Network Datacenter Connectivity	\$150,000
Campus Exterior Improvements	\$75,000
Training	\$10,000
Project Cost	\$985,000

## **Timeline**

Design – 3 months

Construction - 6 months

Implementation – 3 months

Total – 12 months

## **Initiative #2 – Campus Network and System Security**

### **Project Description**

The network and system security is a collection of tools and monitoring systems that proactively monitor and log data entering into and out of the campus network. The campus security systems are directed by The Critical Security Controls for Effective Cyber Defense set forth by the Council on CyberSecurity which is the security program that the OIT follows. The security system looks for patterns of suspicions or malicious activity and records machine data for analysis and logging. The systems provide secure connections to vital resources such as DNS and encrypted traffic while at the same time inspecting the traffic for hackers attempting to steal data or phish personal information.

### **Background and Justification**

Students, staff and faculty are connected to more systems outside of CSU-Pueblo than ever before. But with this connectivity comes the increased threat of data breaches and the loss of personal information as the systems that are required to conduct day to day operations are also connected to the outside world. The ever increasing threats from hackers and cybercriminals are requiring robust information security programs and tools to combat the threats. The OIT's Office of Information Security has provided guidance and leadership in combating these threats and CSU-Pueblo is striving to model their information security plan after the OIT's Office of Information Security security plans.

The campus network and system security upgrade is to install systems and tools that follow The Critical Security Controls for Effective Cyber Defense set forth by the Council on CyberSecurity (Otherwise known as the CSC 20 rules). This is the security framework that the OIT's Office of Information Security has been successful in implementing to minimize the threats present in today's information technology landscape.

The first upgrade would be software and systems that allow the Critical Security Control Rule 11: Limitation and Control of Network Ports, Protocols, and Services to be implemented. This is the limiting of ports, protocols, and services with validated business needs and host-based firewalls or port filtering tools on end systems. The main tool in this area would be secure DNS

servers to prevent man in the middle attacks and network analysis tools to inspect traffic in real time for malicious activity and port spoofing.

The next area would be to cover Critical Security Control Rule 14: Maintenance, Monitoring, and Analysis of Audit Logs. This would be software to aggregate machine data and analyze and identify anomalies in logs. This software is known as Security Incident and Event Management software (SEIM) or log analytic tools for log aggregation and consolidation from multiple machines and for log correlation and analysis.

The final area that would be covered in this upgrade would be to tools and software to cover CSC Rule 3: Secure Configurations for Hardware and Software on Mobile Devices, Laptops, Workstations, and Servers and CSC 4: Continuous Vulnerability Assessment and Remediation. At present the CSU-Pueblo campus does not have any way to quickly and effectively audit the security position of the campus and these tools would allow the requirements of the above rules to be met.

### **Cost-Benefit Analysis and Project Alternatives**

The network and security system is based completely on cost avoidance. A security industry report determined that a security breach is three (3) times more expensive than the security controls that would have prevented it. Recent high profile breaches such a Target, Anthem and the multitude of others has shifted the focus of the campus to protect the information of its customers, employees, and stakeholders.

This project is to align with the OIT Office of Information Security's goal to have all new systems evaluated and monitored in real time.

There were no alternatives to this project other than to continue on with the current systems which are known to be inadequate. This program is a cost avoidance issue and also contains the intangibles of damage to the credibility of CSU-Pueblo.

### **Consequences if not Funded**

The consequences of not placing resources into security are the loss of confidence in the customers and the cost of remediating the damage from a breach. Unfortunately there are significant financial gains for the hackers and cybercriminals so this threat will be persistent and only get more complex as the resources of the hackers get better.

**Assumptions for Calculations**

Security Software	\$305,000
Training and Implementation	\$50,000
Project Cost	\$355,000

**Timeline**

- Design with OIT – 3 months
- Implementation, Training, Documentation – 18 months
- Total – 24 months

**Initiative #3 – Provide Digital Technology to all Classrooms**

**Project Description**

Digital Classrooms are technology enhanced classrooms that provide opportunities in the classroom by integrating learning technology, such as computers, specialized software, audience response technology, assistive listening devices, networking, and audio/visual capabilities. The Digital classrooms are equipped with ceiling mounted projectors and projection screen, laptop / desktop connectivity, enhanced sound system, touchscreen control system, telecommunications, and video recording capabilities.

**Background and Justification**

CSU-Pueblo has 130 classrooms that are outfitted with a desktop computer, an analog controller, and at least 1 projector. The initiative would be to upgrade the teaching podiums to a standard digital system that would allow the use of devices independent of the manufacture and thus allow, faculty, students, and guest speakers to present and interact with students in the classroom. Additionally select classrooms would be upgraded to video telepresence enabled classrooms that would allow content to be streamed into or out of the classroom for distance learning and collaboration.

At present time the systems are connected via analog connections and do not support new technology such as iPads, Apple computers, or other digital inputs. Presentations and teaching must either be conducted via whiteboards in the classroom or via the computer in slides and presentations. This initiative would upgrade all of the classrooms to digital media connections that would allow the faculty and staff to connect to the classroom audio and video equipment

via multiple digital sources. Requests are ever increasing from both faculty and students that new teaching methods such as hybrid classes or experiential teaching and thus this is difficult to accomplish as the current classrooms do not support the technology required to teach the classes.

**Cost-Benefit Analysis and Project Alternatives**

One of the alternatives reviewed was to not offer the enhanced learning experience of smart classrooms, and using more traditional non-internet and technology based teaching. Over the past couple of years there has been an increase in the number of instructors wanting to teach hybrid classes and those that did had difficulties in doing so as the classrooms are not equipped to support that type of instruction. Other alternatives such as complete online learning have been explored but research by Rutgers and other universities have shown that a mixture of digital delivery and face to face interaction has been shown to be preferred by both faculty and staff.

**Consequences if not Funded**

Not funding the digital equipment upgrades will prevent the university from taking advantage of 21st century technology. Faculty, staff, and students all have an increased reliance on technology in terms of availability, confidentiality, and integrity. Upgrading these components will allow all university constituents to work more efficiently and also help attract and retain students to campus. Higher education has become a very competitive market and any decreases in enrollment will have a significant impact on the financial stability of the campus.

**Assumptions for Calculations**

130 classrooms to upgrade

Digital cabling 130 rooms	\$195,000
Digital equipment, media, audio video 130 rooms	\$1,189,500
Project Cost	\$1,384,500

## **Timeline**

Design – 3 months

Implementation, Training, Documentation – 9 months

Total – 12 months

## **Initiative #4 – Unified Messaging Implementation Across Campus**

### **Project Description**

A Unified Messaging system integrates traditional telephone systems with communications media (e-mail, fax, video messaging, etc.) technologies into a single interface, accessible from a variety of different devices. Unified messaging solutions enhance and improve business productivity while decreasing communication issues. It also reduces the need to travel for communication and extends the campus out to other geographic areas not limited to Pueblo.

### **Background and Justification**

The unified messaging initiative is to replace separate and end of life equipment with a single communication system that allows end users the ability to interact via voice, video, and instant messaging from a common system that is available on a variety of devices. The current communication systems at CSU-Pueblo is a traditional PBX phone system, Microsoft Exchange for email, and various standalone implementations on video teleconferencing. The Fujitsu XL 9600 PBX phone system is 15 years old and is not VoIP capable. In, addition, it has not been supported by the manufacturer for over five years. Parts and spares are difficult to obtain and reliable operation of the system is at risk if critical components need to be replaced. The implementation of a unified communication system will reduce long distance costs by its use of the campus WAN connection to the outside world. It will also improve video teleconferencing capability on campus via the use of the University's LAN.

### **Cost-Benefit Analysis and Project Alternatives**

The options that were reviewed were to continue to use the existing systems and attempt to obtain replacement parts or look to using a third party or hosted solution for VoIP telephone service. Typical hosted messaging solutions cost approximately \$10 per subscriber line and the system is subject to the availability of the internet as that is how it is delivered. CSU-Pueblo looked at what other state agencies have done such as the Colorado Department of Transportation and the savings that they have reported in travel costs and messaging costs determined that the unified messaging was the best choice.

### **Consequences if not Funded**

The campus is already behind many other state institutions with regards to messaging and technology and this would put the campus further behind. CSU-Pueblo is one of the last campuses to still use a PBX phone system and thus is not able to take advantage of many of the features and efficiencies that unified communications provides.

### **Assumptions for Calculations**

System would replace about 1000 PBX handsets

Software and licensing	\$288,600
Servers, storage, peripherals	\$427,500
Life safety power backup	\$96,000
Implementation	\$90,000
Project Cost	\$902,100

### **Timeline**

Design – 3 months

Implementation, Training, Documentation – 9 months

Total – 12 months

### **Initiative #5 – Purchase New Fiber Optic Truck**

#### **Project Description**

CSU-Pueblo is responsible for maintaining the CDOT fiber in southern Colorado as part of an MOU for using the fiber. The current splicing truck is over 20 years old, and is in need of replacement with a new and more reliable unit. The truck and equipment it contains is constantly in demand for campus telecommunications and fiber optic splicing needs for both emergency and non-emergency situations. The truck is required as higher education is allowed to use the fiber owned by the Colorado Department of Transportation in exchange for maintenance and repair of that fiber.

#### **Background and Justification**

This initiative is to purchase a truck to replace that aging truck used for fiber optic repairs and splices which connects the CSU-Pueblo campus to the rest of the state. Currently there are only two (2) fiber optic repair vehicles in the state of Colorado and they are located at the CSU-

Pueblo campus and the CSU-Ft Collins campus. CSU-Pueblo has a memorandum of understanding with CDOT that we are allowed to use the CDOT fiber for our internet traffic in exchange for splice and repair work for CDOT on the lines. The CSU-Pueblo splice truck provides fiber repair and new connections for UC-Colorado Springs, CSU-Pueblo, Colorado School of Mines, CDOT, UCAR and the FRGP.

### **Cost-Benefit Analysis and Project Alternatives**

The alternative to purchasing a new fiber truck was to contract out to have the work performed. The average cost for a vendor to perform a splice or repair is \$2500. On average the fiber truck is used four (4) times per month. Performing the calculations of having a vendor perform the splice and repair work shows that the campus could expect to pay about \$120,000 per year for fiber repair. This would increase the cost to the university as this would have to be paid for with operating budgets. Based on the amount the truck would be used the ROI on the truck would be two (2) years.

### **Consequences if not Funded**

The ability to repair the fiber for CDOT in the southern part of the state is part of an agreement between higher education and the CDOT for the use of the fiber optic lines to connect campuses across the state. The inability to repair the fiber would require CSU-Pueblo to contract out the work at a much higher expense and with a longer time to repair.

### **Assumptions for Calculations**

Fiber splice truck	\$130,000
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### **Timeline**

Procurement, configuration, and delivery – 3 months

Total – 3 months

## **Summary of Infrastructure Improvement Costs**

Description	Total Cost
Initiative #1 – New Redundant Containerized Datacenter	\$985,000
Initiative #2 – Campus Network and System Security	\$355,000
Initiative #3 – Provide Digital Technology to all Classrooms	\$1,384,500
Initiative #4 – Unified Messaging Throughout Campus	\$902,100
Initiative #5 – Purchase New Fiber Truck	\$130,000
Contingency at 5%	\$187,830
<b>TOTAL</b>	<b>\$3,944,430</b>

## CDHE and State of Colorado Technology Goals

This Program Plan purposefully takes into account all Department of Higher Education and State Technology goals, which are also listed below. The Information Technology Campus Connectivity and Classroom Enhancements speak directly to improved access, more modern computers and technology, electronic services and workflow, and most important an enhanced learning experience that will positively impact student employability and support demands of Colorado employers.

### DHE

- a) Provides full access to campus networks
- b) Provides access to modern computers and software
- c) Ensures minimum Internet access to faculty, students, and administration
- d) Provides network support to accommodate demand
- e) Provides for technology-enhanced classrooms and labs
- f) Provides for training and development to ensure proficient use of information technology
- g) Provides for electronic student services
- h) Supports efficient use of information for administrative workflow processing, decision-making, and reporting both within the institution and with DHE
- i) Provides digital library resources
- j) Provides systems to support outreach
- k) Supports distance learning to increase student access to instruction
- l) Promotes the coordination of distance learning development within governing board system and within institution
- m) Supports the workforce needs of Colorado employers
- n) Other

### STATE

- a) Makes use of the Multi-use Network
- b) Makes use of the Beanpole Fund – Not Applicable
- c) Streamlines service to the beneficiaries
- d) Implements cutting-edge technologies
- e) Transforms the institution by implementing uses of the Internet for e-commerce and new management efficiencies
- f) Replaces costly, cumbersome procedures with paperless, on-line methods
- g) Builds on Colorado's world-recognized leadership in the development of telecommunications technology
- h) Other

## University Mission Statement and Strategic Plan

The University's name, mission and role were changed by the Colorado Legislature effective July 1, 2003. House Bill 02-1324 (Section 23-55-101) of May 2002, establishes Colorado State University – Pueblo University's Mission Statement as:

***Section 23-55-101. University established – role and mission.***

*There is hereby established a University at Pueblo, to be known as Colorado State University – Pueblo, which shall be a regional, comprehensive university, with moderately selective admissions standards. The University shall offer a broad array of baccalaureate programs with a strong professional focus and firm grounding in the liberal arts and sciences. The University shall also offer selected Masters-level graduate programs.*

The University's Strategic Plan 2015-2020 contains technology and technology-related goals that guide the work of Information Technology Services (ITS) and technology decisions across campus. The plan identifies four major goals of the University, each of which requires development and support of campus technology. Goal 4 directly addresses technology needs:

***Goal Four: Supportive Student Life***

*We will provide our students a supportive student life experience that addresses their academic, social, physical, and technological needs.*

***Objectives:***

- 1. Enhance/increase co- and extra-curricular opportunities for involvement and engagement for students.***
- 2. Provide opportunities for networking, leadership, and mentoring opportunities for students both on and off-campus.***
- 3. Provide modern and relevant campus facilities and technology.***
- 4. Create Sophomore Experience Program.***
- 5. Improve campus residential life.***

***Objective Three - Provide modern, comfortable, and safe campus facilities and technology to support student learning***

*Modern, comfortable, safe facilities play an important role in attracting new students as well as improving the quality of life for all students, faculty, and staff. Reliable and current technology is crucial to providing an academic environment that supports teaching, learning, and research and creative activity.*

**1. Measure:** *Provide a totally wired/wireless campus by 2020.*

**A. Strategy:** *Promote an environment for academic success by increasing connectivity campus wide.*

**B. Strategy:** *Maintain and update computer labs across campus as necessary.*

The mission of Information Technology Services at Colorado State University-Pueblo is to provide a broad spectrum of support for the planning, development, deployment, and integration of state-of-the-art facilities, infrastructure, and services to support the information technology needs of the academic, research, and administrative functions of Colorado State University-Pueblo. This unit provides oversight, management, coordination, integration, and staffing of Technology Support Services, Network and Systems Support Services, Information Support Services, Instructional Development and Educational Technology Support Services, and Telephone and Network Services.

## SUMMARY

In this digitally dynamic 21st century, technology will play an ever increasing critical role in higher education. Institutions will need to adopt technologies that will change the way students learn, communicate, produce, collaborate, and study, as well as improve interactions between faculty, staff, and students. Creating innovative services from these technologies requires a powerful, reliable, expandable, and secure IT infrastructure that has adequate bandwidth, quality of service (QoS), and storage. Many colleges and universities have already developed short and long term plans to ensure success in meeting their current and future needs. Colorado State University – Pueblo is no different in this regard and we have our own short and long term approaches to these challenges, which we are currently addressing or planning to implement.

This specific state funds request for a campus network infrastructure upgrade with key technology needs such as a back-up containerized data center, network and system security, digitally connected classrooms, a modern unified messaging system. Additionally, it will give the platform with the new infrastructure needed for any future change of major administrative and academic support applications, such as a Student Information System (SIS) or Enterprise Reporting Platform (ERP).

In order to keep pace with our peer institutions and the demands of higher education, as well as satisfy Colorado Department of Higher Education and State goals, we need to complete the required infrastructure and business continuity for the CSU-P campus. This will make the university a respected credible partner of choice in delivering Colorado's needs in fueling a premier workforce and showcasing Colorado's world recognized leadership in telecommunications.

**Form CC-P IT**

<b>Five-Year Capital Construction Program FY 2016-17 to FY 2020-21</b>		<b>Prepared By:</b>	Bret Naber	
		<b>Phone:</b>	970-351-1887	<b>E-Mail:</b> <a href="mailto:bret.naber@unco.edu">bret.naber@unco.edu</a>

<b>Agency or Institution:</b>	University of Northern Colorado			
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Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2015-16	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Wireless and Network Upgrade	Capital Construction Funds	CCF	\$3,123,300	\$0	\$3,123,300	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Purpose Code:</b> F4	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Gross Square Ft:</b>	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Project Type</b>	Total Funds	TF	\$3,123,300	\$0	\$3,123,300	\$0	\$0	\$0	\$0
<b>Renovation</b>									

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2015-16	Year Two Request	Year Three Request	Year Four Request	Year Five Request
DataCenter Hardware Upgrade	Capital Construction Funds	CCF	\$2,500,000	\$0	\$0	\$2,500,000	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Priority:</b> IT 2	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Purpose Code:</b> F4	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Gross Square Ft:</b>	Total Funds	TF	\$2,500,000	\$0	\$0	\$2,500,000	\$0	\$0	\$0
<b>Project Type</b>									
<b>Renovation and Expansion</b>									

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2015-16	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Voice and Storage Upgrades	Capital Construction Funds	CCF	\$900,000	\$0	\$0	\$0	\$900,000	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Priority:</b> IT 3	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Purpose Code:</b> F4	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Gross Square Ft:</b>	Total Funds	TF	\$900,000	\$0	\$0	\$0	\$900,000	\$0	\$0
<b>Project Type</b>									
<b>Renovation</b>									

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2015-16	Year Two Request	Year Three Request	Year Four Request	Year Five Request
Backup and Recovery Systems	Capital Construction Funds	CCF	\$600,000	\$0	\$0	\$0	\$0	\$600,000	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Priority:</b> IT 4	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Purpose Code:</b> F4	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Gross Square Ft:</b>	Total Funds	TF	\$600,000	\$0	\$0	\$0	\$0	\$600,000	\$0
<b>Project Type</b>									
<b>Renovation</b>									

Project Title:	Funding	Source	Total Project Cost	Prior Appropriation	Budget Year Request Yr 1 FY 2015-16	Year Two Request	Year Three Request	Year Four Request	Year Five Request
	Capital Construction Funds	CCF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Cash Funds	CF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Priority:</b>	Reappropriated Funds	RF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Purpose Code:</b>	Federal Funds	FF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Gross Square Ft:</b>	Total Funds	TF	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Project Type</b>									

**CC-IT: CAPITAL CONSTRUCTION INFORMATION TECHNOLOGY REQUEST FOR FY 2016-17**

Agency or Institution:	University of Northern Colorado	Signature Department or Institution Approval:	<i>Kim L. Naber</i> 8-3-15
Project Title:	Wireless Expansion and Modernization	Signature CICHE Approval:	Date
Project Year(s):	FY 2015 -2016	Signature OIT Approval:	Date
Agency or Institution Priority Number:	1	Signature OSPB Approval:	Date
Program Plan:	Yes	Name and e-mail address of preparer:	<a href="mailto:bret.naber@unco.edu">bret.naber@unco.edu</a>

Revision? Yes No	Total Project Costs	Total Prior Year Appropriations	Current Request FY 2016-17	Year 2 Request	Year 3 Request	Year 4 Request	Year 5 Request
<b>A. Land Acquisition</b>							
(1) Land /Building Acquisition	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>B. Contract Professional Services</b>							
(1) Consultants/Contractors	\$ 50,000	\$ -	\$ 50,000	\$ -	\$ -	\$ -	\$ -
(2) Quality Assurance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Independent Verification and Validation (IV&V)	\$ 2,500	\$ -	\$ 2,500	\$ -	\$ -	\$ -	\$ -
(4) Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5) Leased Space (Temporary)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(6) Feasibility Study	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7a) Inflation for Professional Services	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(8) Other Services/Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(9) Total Professional Services	\$ 52,500	\$ -	\$ 52,500	\$ -	\$ -	\$ -	\$ -
<b>C. Associated Building Construction</b>							
(1) (a) New (GSF):	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New \$ /GSF							
(b) Renovate GSF:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Renovate \$ /GSF							
(3) Site Work/Landscaping	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Other (Specify)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5a) Inflation for Construction	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(6) Total Construction Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>D. Software Acquisition</b>							
(1) Software COTS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) Software Built	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4a) Inflation on Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4b) Inflation Percentage Applied		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(5) Total Software	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>E. Equipment</b>							
(1) Servers	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(2) PCs, Laptops, Terminals, PDAs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Printers, Scanners, Peripherals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Network Equipment/Cabling	\$ 2,970,800	\$ -	\$ 2,970,800	\$ -	\$ -	\$ -	\$ -
(5) Other (Specify)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(6) Miscellaneous	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(7) Total Equipment and Miscellaneous Costs	\$ 2,970,800	\$ -	\$ 2,970,800	\$ -	\$ -	\$ -	\$ -
<b>F. Operating Cost</b>							
(1) Maintenance Costs	\$ -	\$ -	\$ 36,500	\$ -	\$ -	\$ -	\$ -
(2) Repair Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Staffing/Employee Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(4) Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(5) Total Operating Costs	\$ -	\$ -	\$ 36,500	\$ -	\$ -	\$ -	\$ -
<b>G Total Project Costs</b>	\$ 3,023,300	\$ -	\$ 3,023,300	\$ -	\$ -	\$ -	\$ -
<b>H. Project Contingency</b>							
(1) 5% for New (Switches are refurbished)	\$ 100,000	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -
(2) 10% for Renovation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(3) Total Contingency	\$ 100,000	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -
<b>I. Total Budget Request (F+G(3))</b>	\$ 3,123,300	\$ -	\$ 3,123,300	\$ -	\$ -	\$ -	\$ -
<b>J. Source of Funds</b>							
GF	\$ 3,123,300	\$ -	\$ 3,123,300	\$ -	\$ -	\$ -	\$ -
CF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
RF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
FF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

check (should = H) 53,123,300 50 53,123,300 50 50 50 50 50

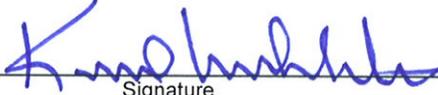


COLORADO

John W. Hickenlooper  
Governor

Kay Norton  
Executive Director

University of Northern Colorado  
FY 2016-17 Capital IT Request | 7/24/15

  
Signature

8.3.15  
Date

**Department or CCHE Capital Construction Priority: IT #1**  
**Wireless and Network Infrastructure Upgrade**

Summary of Capital Construction Request	Total Funds	CCFE
FY 2016-17	\$3,123,300	\$3,123,300

**Request Summary:**

Replace UNC's aging wireless and network infrastructure. This project would replace failing network components, upgrade bandwidth capabilities, upgrade wireless coverage and increase functionality of network. The upgrade will cost approximately \$3,123,300.

**Project Description:**

This project will allow UNC to upgrade major network components in order to support modern wireless controllers and access points, take advantage of increased bandwidth, and increase the ability to interface with other devices. The upgrade will allow for more Power over Ethernet (PoE) connections enabling better capability for other campus infrastructure such as building automation and security cameras. The current wireless and network infrastructure is operating on 7 to 8 year old technology. The technology was purchased during a large VoIP implementation. If this proposal is funded, UNC would not renew maintenance and licensing on legacy hardware. The legacy hardware is of little to no value. UNC would evaluate the condition and determine if it could be sent to surplus, bought back by the vendor or liquidated. During the project, we will transition building by building in a rapid forklift implementation. We will work within well-established maintenance windows to impact the campus as little as possible. UNC has recently upgraded bandwidth and established a recurring budget for UPS battery backup systems. In addition, UNC has upgraded and implemented generators on campus. Power issues are a major concern for network devices. The planning effort of UNC facilities ensures that network devices experience fewer surges, brownouts, and power losses. Requests for wireless upgrades have been collected from UNC students, faculty staff through our campus project request process. This upgrade will give UNC the necessary funding to bring the technology up to current needs and standards and futureproof us for the next 5-7 years. Completing this project over several years with small purchases does not allow for opportunities for bulk purchasing discounts and creates compatibility issues with network devices as they change annually. This request is not a continuation of any other project that has been requested.

### **Background and Justification:**

This project is needed because the existing wireless technology is failing and has reached the end of its useful life. There is also an increase in wireless needs from the modern student who relies on multiple devices and requires more bandwidth for high definition media. In addition to the student and faculty needs, more campus infrastructure relies on wireless technology. Building automation and life safety equipment take advantage of the wireless infrastructure. Current network devices have become obsolete and new standards have moved technology forward significantly. The new network hardware will be able to provide Power over Ethernet (PoE) and provide greater bandwidth for students and faculty. Existing equipment does not have the power capacity needed for modern wireless access points and other facilities equipment. The funding is needed in order to upgrade the technology at one time saving upwards of a million dollars over several years. Equipment is failing and has to be purchased as needed. We are not able to take advantage of strategic purchases and increase functionality of new devices.

### **Implementation Plan**

The University of Northern Colorado employs several IT specific project managers. A project manager will be assigned and the original scope will be reviewed. Stakeholders and technical staff will attend a kickoff meeting where project policies and procedures will be reviewed. One of the main procedures reviewed will be the change management policy that includes communication plans to students, faculty and staff. UNC has a well-defined maintenance window (Thurs, Sat and Sun 5am-7am) that will be used to install equipment. This project will use a forklift type implementation. Network closets will be built in parallel and switched over during maintenance windows. Access point installations will be scheduled with building coordinators and communicated through our change management process. Training will be provided through online sessions with Cisco. The project will take 9-10 months to complete. We will work with and communicate with our IT governance group that includes Academic, Student and Administrative units.

	Start Date	End Date
Procurement and Contracting	May 2016	July 2016
Planning	May 2016	August 2016
Training	June 2016	August 2016
Execute/Implement	September 2017	January 2017
Project Closure	January 2017	February 2017

### **Alignment with OIT Best Practices**

This project and network design aligns with industry best practices for network operation. Specifically Cisco and SANs recommended best practices. This includes end user policies, authenticated access, and encryption.

The project will follow the Project Management Institutes project implementation strategies.

### **Security and Backup/Disaster Recovery**

This project will allow UNC to build a redundant and robust network infrastructure. The network is relied upon for life safety and security devices. The increased capabilities will also allow for cameras and other devices to be installed where power may not have been previously available. The increased wireless capabilities include higher levels of encryption and security features. Current devices are on terminal version releases which are more vulnerable to hacking and data loss.

### **Business Process Analysis**

The inadequacies of the wireless and network infrastructure were identified through our campus project process and discussions with key leadership. Students have signed a petition asking for more bandwidth and better wireless coverage. After the concern was identified we started a study to identify technology requirements and equipment that had reached end of life. Current network devices are becoming obsolete. We brought in several vendors and looked at several designs. We settled on two vendors. Due to the recent purchase of Aruba by HP we decided that we would continue to invest in Cisco. We have internal expertise in Cisco and we have had success in the past. We also used a 3<sup>rd</sup> party vendor to review pricing from Cisco. We had engineers at Cisco complete a site survey. The cost of the implementation was more than UNC could fund at one time. We looked at possibilities to break the project up into phases that would continue to move UNC forward and attempt to catch up with campus expectations. We have increased bandwidth, border router capabilities, and reliability of power. In order to make the next upgrade, we need significant funding to install switches with Power over Ethernet (PoE) in order to power wireless access units. These items need to be completed together. During our analysis we have talked to several public and private institutions about alternatives. We have done extensive research through Educause and other research groups. The need for bandwidth through wireless is increasing at a 5 to 1 ratio. In order to catchup with our Institutions needs we need one time funding to upgrade our network.

### **Systems Integration Opportunities**

UNC wireless design and procuring strategies will be shared with other Colorado Higher Education institutions. We meet with other Colorado Higher Education institutions on a monthly basis through the Colorado Higher Education Computing Organization (CHECO).

### **Program Plan**

The program plan provided describes the project, the project budget, the benefits, alternatives considered, the reasons for choosing this approach.

### **Cost Savings and Improved Performance Outcomes**

We have looked at several alternatives for hardware. We believe very strongly that the best choice for UNC is Cisco equipment. We are heavily invested in Cisco from a staffing perspective and in compatibility of equipment. If we were to select another competitor there is a slight cost reduction in cost of roughly \$100k. This savings is out weighed in ongoing maintenance, training, and compatibility. We have used senior Cisco technicians to evaluate campus needs. UNC employs network engineers with Cisco industry certifications. We completed several coverage and saturation studies to determine where coverage is needed. We also used a third party, Info-Tech Research Group, to determine if our quote was as low as possible. We have decided that we can use refurbished Cisco certified pre-owned equipment that can save us up to \$300k depending on availability of equipment.

## Cost-Benefit Analysis and Project Alternatives

Project Alternatives	
No Action - Weakness	Bulk purchasing will save roughly 20%. Uncontrolled variable expenses will be incurred in the operation budget as equipment fails.
No Action – Weakness	Students, staff, and faculty will not be able to take advantage of increased bandwidth.
No Action – Weakness	System failures will occur impacting education activities, life safety and building automation.
Multiple Vendors - Weakness	Purchasing equipment (Wireless Controllers, Access Points, and Switches) together from the same vendor increases compatibility and reliability. Staffing administration time will increase significantly if several vendors supply equipment.
Alternative Vendor – Weakness	UNC infrastructure is built on Cisco equipment. Staff are trained and certified on Cisco equipment. Cisco training resources are readily available. Cisco TAC customer support has been very reliable and a single vendor for support ensures accountability and problem ownership when troubleshooting issues. Resources can be acquired very quickly for outsourcing and staff backfilling if needed.
Alternative Vendor – Strength	Total cost of ownership for Cisco equipment tends to more expensive than competitors.
Slow Rollout – Weakness	Technology purchase over several years will create compatibility issues. Equipment will increase in cost year after year. Bulk purchasing discounts will less substantial.
Slow Rollout – Strength	New technologies will emerge.

### Consequences if not Funded:

Current hardware is at capacity and is past a typical lifecycle for this type of equipment. As this equipment fails we be challenged to find support. We would also be required to make emergency hardware purchases to replace failed equipment, which is end of life and has no manufacture warranty. Purchasing this equipment as needed or as it fails is far more expensive than replacing it at one point in time. We would lose major purchasing power that comes with a large bulk buy.

### Operating Budget Impact:

We currently have the appropriate staffing to support this project and ongoing maintenance. The upgrade would represent an additional \$40k in maintenance annually for new networking gear. UNC can fund this maintenance moving forward.

**Assumptions for Calculations:**

Item	Estimated Upfront
Controllers	\$ 250,000.00
Wireless Access Point Investment	\$ 674,300.00
Switch Investments	\$ 2,046,500.00
Cabling Cost	\$ 50,000.00
Contingency / Availability of Refurb	\$ 100,000.00
<b>TOTAL</b>	<b>\$ 3,120,800.00</b>

Cisco Simplified BOM	
Item	Qty
8510 Controllers	2
48 port 3850, full POE	365
24 port 3850, full POE	80
4500X switches	18
10G LR	110
10G SR	10
3702i APs	675
702W APs	55
1572E APs	55
3702P APs	32
1002X router	1

ADDITIONAL REQUEST INFORMATION	
Please indicate if three-year roll forward spending authority is required.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Date of project's most recent program plan:	7/1/2015
Please provide the link to the program plan or attached the first page of the analysis to this document:	Attached
Request 6-month encumbrance waiver?	<input type="checkbox"/> Yes <input type="checkbox"/> No
New construction or modification?	<input type="checkbox"/> New <input type="checkbox"/> Renovation <input type="checkbox"/> Expansion <input type="checkbox"/> Capital Renewal
Total Estimated Square Footage	_____ ASF _____ GSF
Is this a continuation of a project appropriated in a prior year?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If this is a continuation project, what is the State Controller Project Number?	

<b>ESTIMATED PROJECT TIME TABLE</b>		
<b>Steps to be completed</b>	<b>Start Date</b>	<b>Completion Date</b>
Procurement and Contracting	May 2016	July 2016
Planning	May 2016	August 2016
Training	June 2016	August 2016
Execute/Implement	September 2017	January 2017



**COLORADO**

*John W. Hickenlooper*  
Governor

University of Northern Colorado

Wireless and Network Upgrade Program Plan | 7/24/15

**Kay Norton**  
Executive Director

Signature

Date

***Wireless and Network Infrastructure Upgrade***

Summary of Capital Construction Request	Total Funds	CCFE
<b>FY 2016-17</b>	<b>\$3,123,300</b>	<b>\$3,123,300</b>

The University of Northern Colorado is seeking funding to help upgrade and replace the aging wireless and network infrastructure on campus. This project has become necessary due to aging hardware and an increase in demand for wireless coverage and bandwidth. UNC has prepared for the upgrade with investments in bandwidth, border network devices, intrusion prevention, power upgrades, and staffing. To continue the upgrade a major investment must be made for network switches, wireless controllers and wireless access points. The purchase needs to be made at one point in time in order to save significant amounts of money and ensure compatibility of devices. Extensive research has been completed by internal staff and by external resources. Several other state institutions have assisted with research and planning efforts. This project plan can be used to assist other state agencies with similar needs.

**Project Benefits**

Replace Aging and Failing equipment.	Current network switches are 7 to 8 years old and are no longer under warranty. Replacing switches as needed is costly and outages are increasing.
Increase wireless coverage	Increase coverage and bandwidth in academic and residential buildings.
Meet Student and Faculty Expectations - Bandwidth	Allow wireless infrastructure to take advantage of increased bandwidth. Take advantage of 802.11AC technology.
Provide Power over Ethernet(PoE)	Power can be provided from new network switches. This will be necessary to power new wireless access points and other network devices.
Sustainability	New network capabilities will allow for greater integration with building automation and life safety systems. Examples – Wireless thermostats, wireless locks, WiFi calling in location where cell service is not available, and cameras)
Increased Security	The increased wireless capabilities include higher levels of encryption and security features. Current devices are on terminal version releases which are more vulnerable to hacking and data loss.

## **Success Factors**

### Preparation

The University of Northern Colorado has recently upgraded bandwidth and established a recurring budget for UPS battery backup systems. In addition, UNC has upgraded and implemented generators on campus. Power issues are a major concern for network devices. The planning effort of UNC facilities ensures that network devices experience fewer surges, brownouts, and power losses.

## **Selection Criteria**

### Business Process Analysis

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## Project Alternatives

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## Implementation Plan

The University of Northern Colorado employs several IT specific project managers. A project manager will be assigned and the original scope will be reviewed. Stakeholders and technical staff will attend a kickoff meeting where project policies and procedures will be reviewed. One of the main procedures reviewed will be the change management policy that includes communication plans to students, faculty and staff. UNC has a well-defined maintenance window (Thurs, Sat and Sun 5am-7am) that will be used to install equipment. This project will use a forklift type implementation. Network closets will be built in parallel and switched over during maintenance windows. Access point installations will be scheduled with building coordinators and communicated through our change management process. Training will be provided through online sessions with Cisco. The project will take 9-10 months to complete. We will work with and communicate with our IT governance group that includes Academic, Student and Administrative units.

	Start Date	End Date
Procurement and Contracting	May 2016	July 2016
Planning	May 2016	August 2016
Training	June 2016	August 2016
Execute/Implement	September 2017	January 2017
Project Closure	January 2017	February 2017

## Project Funding

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702W APs	55
1572E APs	55
3702P APs	32
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## Operating Budget Impact:

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