pGc Paul Garstki Consulting

INDEPENDENT REVIEW

OF A PROPOSED

INTEGRATED PROPERTY TAX MANAGEMENT SYSTEM PROJECT

For the
State of Vermont
Agency of Digital Services (ADS),
Vermont Department of Taxes (VDT)
and
Agency of Administration, Department of Buildings and Generals Services (BGS)

Submitted to the
State of Vermont, Office of the CIO
by:

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1. EXECUTIVE SUMMARY

The Vermont Department of Taxes, Division of Property Valuation and Review, seeks to acquire an Integrated Property Tax Management System (IPTMS) as a real-time, online system for the State to administer the statewide education property tax system. The specific objectives of the project are:

- Enforce and enhance compliance with statutory requirements
- Meet the individual and collective needs of a diverse cross-section of stakeholders
- Consolidate and synchronize property tax data currently maintained in multiple systems
- Improve efficiency, accuracy, and transparency with new features and expanded capabilities

The system is meant to entirely replace the existing system, which is over 20 years old, built on an obsolete software platform, requiring many inefficient manual processes, and posing a reliability risk for the acquisition and use of property tax data.

The State has conducted an extensive procurement process and selected a vendor to design, implement, and support the system. The vendor is Axiomatic, LLC, of New Hampshire.

1.1 COST SUMMARY

Table 1 - Cost Summary

IT Activity Lifecycle (years):		**5**
Total Lifecycle Costs:	**$**	**2,180,994.00**
Total Implementation Costs:	**$**	**1,373,885.00**
New Average Annual Operating Costs:	**$**	**161,421.80**
Current Annual Operating Costs[1]	**$**	**233,801.00**
Difference Between Current and New Operating Costs:	**$**	**(72,379.20)**

1.2 DISPOSITION OF INDEPENDENT REVIEW DELIVERABLES

Table 2 - Disposition of IR Deliverables

Deliverable	Highlights from the Review
Acquisition Cost Assessment	We find that the acquisition costs are valid and appropriate. We do note – and the proposal evaluation team noted this as well – that Axiomatic's proposal to Vermont seems very well priced comparison to other bidders. In spite of this, however, our reading of the scoring documents indicate that functionality and usability were probably more important factors in the choice. We surveyed a number of other states and found that IPTMS systems vary widely due to statutory and regional tax differences. A number of vendors are engaged for these projects. We compared Vermont's annual operating costs for the new project with those of New Hampshire and find that the proposed project provides excellent value for money.
Technology Architecture Review	As a cloud-hosted, pure Software as a Service application, the proposed solution aligns well with Vermont's IT Strategic direction and principles. We found that the project's definition of business process requirements was very strong and bodes well for a good outcome. The vendor's proposed architecture looks generally well-aligned with State preferences and requirements. However, these were sometimes vague or incomplete in the original proposal; we conveyed our concerns to the project team, and during the present review the State completed its Architectural Assessment of the project. We believe that the assessment and its use by the State in informing the contract terms with the vendor will ensure a system architecture

	highly aligned and compatible with State enterprise architecture needs, preferences, and requirements. The system is sustainable. Security requirements are adequate although they will require some further development during the contracting and implementation process. Disaster recovery plans are good. The service level agreement as so far presented by the vendor will not meet State needs for specificity. We recommend further development of that agreement. Integration with State data sources and destinations is well designed and will support business processes as desired.
Implementation Plan Assessment	The vendor has proposed an implementation schedule that is approximately 2 years long. If the State executes a contract soon after this Review, as is hoped, that schedule will coincide roughly with the calendar (not fiscal) year. We like the general approach of using the first year to refine business requirements and design the system, and the second year to develop and implement. The municipalities will need to be involved minimally during the 2020 cycle, where most of the work will take place within PVR. In the beginning of the second year, a handful of municipalities representing a good cross-section of geographic and size distribution will participate as "beta testers," as the vendor develops and refines modules to meet business and usability needs. The timetable for implementation is realistic, and the vendor has provided a very good and detailed list of deliverables with associated milestones. Project management looks to be well designed and aligned with State requirements for project management deliverables, documentation, process, and communication. We noted a need for the State to further develop the training plan as it applies to State resources, particularly the deployment of District Advisors. We also noted a strong reliance on one individual subject matter expert and recommended provide some knowledge transfer and redundancy to best support this resource. The State has embraced both these recommendations.

Cost Analysis and Model for Benefit Analysis	Most of the benefits of this project are intangible, in that they are largely efficiencies and process improvements, and are difficult to quantify. However, many will be measurable after the fact, and we have presented our opinion of each goal and success criteria. In general we think the project is well designed to achieve its objectives. Functionality of the proposed system is significantly and measurably better than the current system. Value to municipalities and to the public is likewise greatly increased. Tangible savings for *annual* operation are estimated at approximately $72,380. (This does not include implementation costs) (See table above)
Analysis of Alternatives	Continuing the current solution is unsustainable. Building a replacement in-house is highly inadvisable and not feasible. Extending an existing State, such as VTax or prospectively, an Enterprise Resource Planning (ERP) system, system to incorporate the project's business needs, is a feasible approach architecturally, but with current proposals is cost-prohibitive. We think it would be an approach to consider in the unlikely event that the current project fails for some unanticipated reason. Aside from the kind of integration described above, any solution meeting State business needs and enterprise architectural preferences is likely to broadly match the selected proposal's architecture of a cloud-based, Software as a Service (SaaS) solution, minimizing impact on State resources. Other states and counties employ a variety of software vendors, including the selected vendor, Axiomatic. Business needs vary nationwide, and we find in other jurisdictions more of a need for emphasizing collections. In this nationwide market, at this point Tyler Technologies predominates, although we acknowledge evolving competition.
Impact Analysis on Net Operating Costs	Over the 5 year lifecycle of this project, the total cost is estimated at $2,180,994 compared to an estimated cost of $1,169,005, if the current system were maintained at its current cost (an unlikely and unsustainable proposition, but useful for comparison). Much of the proposed project cost is

	implementation cost – the annual cost, as mentioned above, is less than the current system. Because of the implementation cost, there is no breakeven point during the initial 5 year contract, although the trend over time is toward convergence and crossing. Funding for the project (100% State) is already in place.
Security Assessment	In general, we think the vendor's security stance is reasonably rigorous and conforms to State requirements and preferences. The vendor has requested that one of the State's standard contract security requirements be struck for this project; we have identified this as a risk and recommended that the State only accede to this request following a determination by the Chief Information Security Officer (CISO) that the vendor's proposed substitution is equivalent and/or adequate in the State's view.

1.3 IDENTIFIED HIGH IMPACT &/OR HIGH LIKELIHOOD OF OCCURRENCE RISKS

NOTE: Throughout the narrative text of this document, **Risks and Issues are identified by bold red text**, and an accompanying tag (**_RISK_ID# _0_**) provides the Risk or Issue ID to reference the risk, response, and reference in the Risk Register.

The following table lists the risks identified as having high impact and/or high likelihood (probability) of occurrence.

Please see the **Risk & Issues Register, in Section 10**, for details.

Identified High Impact &/or High Likelihood of Occurrence Risks in this project:

Table 3 - High Impact or Probability Risks

Risk Description	RATING IMPACT/ PROB	State's Planned Risk Response	Reviewer's Assessment of Planned Response
Vendor, while experienced, is a relatively small technology company. Much of the new system code will be configured	**10** **1/10**	**Elect Software Escrow Option**	**concur**

specifically for Vermont, and some development of code may be Vermont specific. If for any reason vendor ceased business, Vermont could lose access to code necessary for future configuration (e.g., in light of statutory changes). Proposed vendor has offered software escrow. It is unclear at this point if this would be at additional cost.			
Certain key project knowledge is held by one Subject Matter Expert (ADS IT Support for Grand List Solution) and this knowledge is not necessarily accessible in documentation. Unavailability of this resource for any reason could result in delay if the knowledge must be reconstructed from other sources.	**21** **7/3**	*(Reviewer suggested State provide redundancy through knowledge transfer, e.g., by devoting some personnel resource to "shadow" this SME)* **State agrees to an extent. A new resource will be shadowing the current resource on the new build, but they do not have the bandwidth to knowledge transfer everything that goes on in the current system.**	**concur**

1.4 OTHER KEY ISSUES

The Service Level Agreement sample provided by the vendor is not sufficient to meet State needs. Please see **Section 6.8 Service Level Agreement**, *below*. We recommend further specificity, as described in that section.

1.5 RECOMMENDATION

We recommend that the project continue, with risk mitigations as indicated.

1.6 INDEPENDENT REVIEWER CERTIFICATION

I certify that this Independent Review Report is an independent and unbiased assessment of the proposed solution's acquisition costs, technical architecture, implementation plan, cost-benefit analysis, and impact on net operating costs, based on the information made available to me by the State.

E-SIGNED by Paul Garstki
on 2020-02-21 01:27:29 GMT

_____ _____

Signature **Date**

1.7 REPORT ACCEPTANCE

The electronic signature below represent the acceptance of this document as the final completed Independent Review Report.

E-SIGNED by John Quinn
on 2020-02-21 21:40:59 GMT

_____ _____

State of Vermont Chief Information Officer **Date**

2. SCOPE OF THIS INDEPENDENT REVIEW

2.1 IN-SCOPE

The scope of this document is fulfilling the requirements of Vermont Statute, Title 3, Chapter 056, §3303(d):

1. *The Agency shall obtain independent expert review of any new information technology projects with a total cost of $1,000,000.00 or greater or when required by the Chief Information Officer.*
2. *The independent review shall include:*

The independent review report includes:

(A) an acquisition cost assessment;
(B) a technology architecture and standards review;
(C) an implementation plan assessment;
(D) a cost analysis and a model for benefit analysis;
(E) an analysis of alternatives;
(F) an impact analysis on net operating costs for the agency carrying out the activity; and
(G) a security assessment.

2.2 OUT-OF-SCOPE

- A separate deliverable contracted as part of this Independent Review may be procurement negotiation advisory services, but documentation related to those services are not part of this report.

3. SOURCES OF INFORMATION

3.1 INDEPENDENT REVIEW PARTICIPANTS

Table 4 - IR Participants

Name	Initial Interview Date	Employer and Title	Participation Topic(s)
Morgan Amell	2019/11/25	Agency of Digital Services (ADS) Enterprise Project Management Office (EPMO), IT Project Portfolio Manager	Single Point of Contact for this project
Jill Remick	2019/12/09	Vermont Dept. of Taxes (VDT), Director of Property Valuation and Review (PVR)	Overview, Project History, Goals, Benefits
Casey O'Hara	2019/12/09	VDT, PVR Program Manager	Overview, Project History, Goals, Benefits
Alexa Lewis	2019/12/09	VDT, Financial Director	Funding, Finance
Gary Smith	2019/12/10	ADS, Systems Developer for ADS Tax IT	Subject Matter Expert
Michael Steves	2019/12/10	ADS, Security Analyst	Project Security
Mark McClanahan	2019/12/10	ADS, IT Director, Agency of Administration (AOA)	AOA IT Overview
Michael Blanchard	2019/12/11	ADS, Business Analyst	Business Processes
Bill Froberg	2019/12/11	ADS, Enterprise Architect	Enterprise Architecture
Cheryl Burcham	2019/12/16	ADS, IT Project Manager for ADS EPMO	Project Management

Jill Wilson	2019/12/16	ADS, IT Manager assigned to VDT	VDT IT Project Overview
Teri Gildersleeve	2020/01/07	VDT, Operations Chief for PVR, District Advisor	Municipalities, Stakeholders, Training
Deanna Robitaille	2020/01/07	VDT, District Advisor	Municipalities, Stakeholders, Training
Christie Wright	2020/01/07	VDT, Field Director for PVR, District Advisor	Municipalities, Stakeholders, Training
John Hunt	2020/01/10	ADS, Enterprise Architecture	Enterprise Architecture, Architecture Assessment
Justin L. Poirier	2020/01/02	State of Maine, Maine Revenue Services, Property Tax Division, Director	Comparison, Maine Property Tax Systems

3.2 INDEPENDENT REVIEW DOCUMENTATION

The following documents were used in the process and preparation of this Independent Review

Table 5 - IR Documents

Document	Source	Date
IT Activity Business Case & Cost Analysis (IT ABC Form)	State of Vermont	7/25/2018
Integrated Property Tax Management System Project Charter	State of Vermont	2/22/2019
Request for Proposal - INTEGRATED PROPERTY TAX MANAGEMENT SYSTEM (IPTMS)	State of Vermont	2/21/2019
20190410 Axiomatic Official IPTMS Submission	Axiomatic, LLC	4/8/2019
Best and Final Offer -- various documents	Axiomatic, LLC	10/24/2019
ITPTaxMS Architecture Assessment_1216 3.xlsx	State of Vermont	1/3/2020

IPTMS Architecture Assessment Summary (PowerPoint)	State of Vermont	1/13/2020
New Hampshire Department of Revenue Administration Governor and Council Breakfast	State of New Hampshire	1/23/2019
RFP - Tax Modernization System	State of Maine	5/24/2019
SCORESHEET FOR RFP# 201907111: Tax Modernization System	State of Maine	7/11/2019
GL Process Flow 12.10.19	State of Vermont	12/10/2019
NEMRC GL Functional Requirement Inventory Copy 12.10.19	State of Vermont	12/10/2019
Agency of Digital Services Strategic Plan	State of Vermont	1/12/2018

4. PROJECT INFORMATION

4.1 HISTORICAL BACKGROUND

Following the enactment of Act 60 in 1997, the State engaged the current vendor, New England Municipal Resource Center (NEMRC) to develop a Grand List management and support system for use by the State Department of Taxes Property Valuation and Revenue (PVR) Division and town personnel – including primarily assessors and listers – in each of the State's 252 municipalities. This existing system, now over 20 years old, is built on a deprecated database platform (Microsoft Visual Foxpro) which is no longer supported by Microsoft and is obsolete as a 32-bit application with serious interfacing and security shortcomings. Over the years, as statutory and data analysis needs have evolved, PVR has developed in-house databases to interface with the NEMRC solution. These Microsoft Access databases in turn require a significant amount of manual user intervention to exchange data with the NEMRC system and with the municipalities, as well as creating workflow bottlenecks. For example, Current Use data can only be worked on by either the municipality or PVR, not both at once, creating delay and wasted time.

In 2018, PVR issued a Request for Information (RFI), to assess the availability of alternative, more modern solutions to replace the existing system. Based on the information gathered, the State initiated a procurement process for a replacement solution, an Integrated Property Tax Management System (IPTMS), the subject of this Review.

With an Agency of Digital Services (ADS) project manager assisting, and with input from other stakeholders – such as the Vermont Association of Listers and Assessors (VALA), officials from municipalities, the Vermont League of Cities and Towns (VLCT), the Vermont Center for Geographic Information (VCGI), and the Agency of Education (AOE) – the core project team secured State approval to issue a Request for Proposals (RFP) in February of 2019, with responses due in April, and a proposal evaluation team (State personnel only) was set up. A number of proposals were received. From the evaluation process, four "finalists" were identified: NEMRC, Axiomatic, FAST Enterprises (current vendor for the State's VTax system), and Government Utilities Technology Service, Inc (GUTS). The vendors were scored on a range of requirements stated in the RFP.

A series of State-designed demo sessions were arranged. These sessions included a requirement for vendors to load and manipulate State-supplied sample data (consisting a full data extract from a town; this is publicly available information). Follow-up questions were asked and answered. Two site visits were arranged to locations employing the vendors Axiomatic and GUTS (Vermont is already a site for NEMRC and FAST).

The selection process resulted in a consensus decision to select Axiomatic, LLC (Axiomatic) to implement their PropTax solution for the State.

Each municipality in the State uses a software solution generically known as Computer Assisted Mass Appraisal, called a CAMA. The CAMA serves as the tool the municipality employs to gather and prepare data, and it in turn must interface to exchange data with the IPTMS solution. The municipality is free to choose the CAMA it employs, as long as it can interface with the (existing) property tax management system. The State has offered the NEMRC CAMA, MicroSolve, at a discounted rate to municipalities that wish to employ it, but several other CAMAs are in use by municipalities. The CAMA itself is not a part of the proposed project, although through the RFP vendors were invited to propose a State-wide CAMA solution that *could* be used by municipalities; however, the IPTMS solution will have to interact with all the CAMAs in use by municipalities. Currently, there are about 6 variations in use.

4.2 PROJECT GOAL

The Project Charter[1] lists the following project goals

- Improve Efficiency in the Grand List software for State and external users when inputting data and extracting reports for State use across Agencies and Departments, legislative use, municipality use and other external stakeholders.
- Improve Accuracy of all the data products to all the Stakeholders.
- Greater transparency in governance, auditability and process documentation
- Implement expanded capabilities and close the delta between the current system and desired capabilities.
- Improve reporting abilities and provide equal, accurate and real-time access to public data to all.
- Make accurate Property Tax System data accessible to the public and other stakeholders on-demand.
- To improve and enhance enforcement of dynamic statutory requirements.
- Meet the Individual and Collective Needs of a Diverse Cross-Section of Stakeholders
- Reduce or eliminate labor and expense resulting from non-automated data exchanges among municipalities, the State and other stakeholders.
- Upon login, municipal officials will have immediate access to needed information synchronized with other State systems
- Consolidate and synchronize property tax information currently managed by several non-integrated systems.

The IPTMS solution requires applications that fulfill these functions:[2]

- Implement a modular solution that automates and integrates management of a statewide Education Grand List processes.

[1] State of Vermont, *Integrated Property Tax Management System Project Charter*, p. 9

[2] State of Vermont, *IPTMS Architecture Assessment Summary (PowerPoint)*

    - Mission critical processes include:
        - Issuing and tracking tax bills,
        - Homestead declarations,
        - Property tax adjustment payments,
        - Municipal tax rate collection, and
        - Modernize Current Use and Tax Incremental Financing modules.
- A future Grand List Management solution must serve
    - Staff at the Department of Taxes
    - Municipal officials responsible for listing and assessing properties
    - Listers,
    - Assessors, Town Clerks,
- Other Municipal officials
- Implement a modular solution to automate annual Equalization Study processes.
    - Vetting of property sales data
    - Performing statistical calculations required for sales ratio reports
    - Determining municipal and education equalized grand list values by real property category.
- Provide a single standard web-enabled CAMA modular solution able to be used by all 252 municipalities as may be necessary. *(Note: This is an optional component – currently the CAMA is not provided by the State, as explained above.)*
- Implement a modular solution to automate annual Current Use Program enrollment management.

4.3 PROJECT SCOPE[3]

IN-SCOPE

The Project Charter lists the following in scope:

- Municipal and Statewide Grand List Data
- Municipal and Statewide Tax Increment Financing Data
- Municipal and Statewide Current Use Data
- Municipal and Statewide Exemption Data
- Municipal and Statewide Tax Rate Data
- Municipal and Statewide Reappraisal Data
- Equalization Study Results Publication
- Property Tax Adjustment and Homestead Declaration Administration

[3] *Charter,* p. 11

- Current Use Program Parcel Administration
- Integrated Computer Assisted Mass Appraisal system (CAMA) Optional
- GIS integration in municipalities when available
- Education Property Tax Billing Module
- Design of new system
- Testing of new system
- Training of staff and some external users of new system
- Training materials and modules for external users of new system
- Public-access portal for reports and records requests (can be internal)

The Scope of Work from the RFP[4] includes the procurement of the following:

- Design and implementation of a Technical Solution that addresses all stated business need(s);
- Provision of Software Systems and Licenses to implement the Technical Solution;
- Provision of Technical Infrastructure required to support the Technical Solution;
- Professional Services for Project Management to manage the implementation of the technology solution;
- Professional Services to perform Technical Work in support of the implementation;
- Professional Services for Maintenance and Support of the implemented technology.

OUT-OF-SCOPE

The Project Charter lists the following out-of-scope:

- School budget Data
- Property Transfer Tax Return Data
- Current Use application processing

[4] State of Vermont, *Request for Proposal - INTEGRATED PROPERTY TAX MANAGEMENT SYSTEM (IPTMS)*, p 5

4.3.1 MAJOR DELIVERABLES

Table 6 - Major Deliverables

PHASE	TECHNICAL SERVICES	DELIVERABLES

Planning	**Project Initiation**	• Project Schedule
		• Established Project Repository
		• Project Management Plan
		  ○ Change Management Plan
		  ○ Requirements Management Plan
		  ○ Human Resources Management Plan
		  ○ Procurement Management Plan
		  ○ Quality Management Plan
		  ○ Scope Management Plan
		• Project Charter
		• Test Training Plan Draft
		• Technical Architecture Plan Draft
		• Communications Plan Draft (inclusive of stakeholder outreach)
		• Risk Management Plan
		• Action Item Register

	Existing Process Review	• Existing Process Document (Diagrams & Documentation)
	Business Process Reengineering	• Future Process Document (Diagrams & Documentation) • Business Requirements Document
	Gap Analysis	• Functional Gaps documented within business requirements document

	Technical Documentation	• Technical Requirements Document
		  ○ Wireframes
		  ○ Documented Business Logic
		  ○ Database Design & Field Mapping

Development	**Development**	• Conference Room Pilots • Certification of Completion of Development
Testing	**Internal Testing**	• Test Plan for all testing activities including roles and responsibilities • Internal Testing Certification
	User Acceptance Testing (UAT)	• UAT test scripts & related support • Certification of UAT completion
	Installation Testing	• Certification of Installation Testing completion
	Integration Testing	• Certification of Integration Testing completion
	Security Testing	• Certification of security testing completion • Third-party testing report
Data Conversion	**Extract Transform Load (ETL) Process Development**	• Data Conversion Plan & Test Metrics • Data Conversion UAT Scripts • ETL Processors
Deployment	**Cut-Over & Go-Live**	• Data Conversion Certification

Reinforcement	**Training**	• Training Plan
		• Training Materials (PowerPoint)
		• Training Videos (recorded training sessions)
		• Conduct training sessions
		  ○ State
		  ○ Municipal

		○ Public • Online Knowledge base (help documentation)
	On-Going Support	• User Support portal and ticket-based user support • FAQ and Online Knowledge base (help documentation
Close Out	**Project Closeout**	• Deliverables certification • Close out meeting minutes & lessons learned

4.4 PROJECT PHASES, MILESTONES, AND SCHEDULE

Table 7 - Project Phases and Milestones

Project Milestone	New Date
Project charter complete (Milestone)	2/27/2019
RFP submitted to PAT (Deliverable)	1/28/2019
RFP posted (Milestone)	2/21/2019
BAFO due from vendors (Milestone)	10/24/2019
Letter of Intent to selected vendor (Milestone)	11/29/2019
Contract draft due (Deliverable)	1/20/2020
Contract executed (Milestone)	1/31/2020
Write RFP - Independent Review (Deliverable)	10/4/2019
Letter of Intent to vendor - Independent Review (Milestone)	11/8/2019
Contract draft due - Independent Review (Deliverable)	11/20/2019

Project Milestone	New Date
Contract executed - Independent Review (Milestone)	11/22/2019
Vendor start - system solution (Milestone)	1/31/2020
Vendor start - independent review (Milestone)	11/26/2019
UAT testing complete (Deliverable)	3/1/2022
System live (beta) (Milestone)	03/30/2022
Testing and bug fixes (Deliverable)	03/30/2022
New system go live (Milestone)	4/1/2022
Existing NEMRC contract expires (Milestone)	6/30/2021
Project documentation complete	7/1/2022
Project End Date	7/1/2022

5. ACQUISITION COST ASSESSMENT

Table 8 - Acquisition Costs

Acquisition Costs	Cost	Comments
Hardware Costs	**$ -**	No hardware costs to State
Software Costs	**$ 673,852.00**	Supplied by vendors*
Implementation Services	**$ 379,850.00**	Provided by vendor
State Personnel	**$ 190,614.00**	ADS, PM, etc. See attach. 3, Cost Spreadsheet
Professional Services (e.g. Project Management, Technical, Training, etc.)	**$ 129,569.00**	provided by vendor & IR consultant
Total Acquisition Costs	**$ 1,373,885.00**	

**IPTMS vendor, GIS Mapping vendor, parallel (overlap) operation of NEMRC legacy system, NEMRC provision for software updates and legislative changes during this time.*

5.1 COST VALIDATION:

Describe how you validated the Acquisition Costs.

Primary vendor (Axiomatic) software and implementation services costs were derived from the vendor's Best And Final Offer (BAFO) and checked with the vendor's detail cost breakdown. They do not include training services (see below). Other vendor software costs comprise a licensing cost for ESRI ArcGIS Enterprise 4-core only, and the costs of operating the legacy system in parallel (pro-rated), as estimated by the Dept. of Taxes Director of Finance.

State personnel costs were derived from VISION with the assistance of Dept of Taxes Director of Finance -- they include ADS (internal) costs for ADS Security, Tax IT, Project Management, and Enterprise Architecture Services from the inception of the project to Oct of 2019 (selection), as well as an estimate for Dept. of Taxes Business Leads project time only over the same period.

Professional services include the actual cost of the Independent Review, Axiomatic costs for training and support, and NEMRC training for Grand List and MicroSolve (CAMA) use during the overlap period.

5.2 COST COMPARISON:

How do the above Acquisition Costs compare with others who have purchased similar solutions (i.e., is the State paying more, less or about the same)?

Although the processes of property appraisal, listing, evaluation, etc., are common to all states, the business processes of each vary greatly, due to differences in statutory requirements, governmental organization, and regional histories (e.g., in the New England region, the basic unit is the municipality; in the rest of the country, it is usually the county). The proposed vendor claims its product is the only existing platform solely dedicated to state-level property tax management. We cannot confirm this claim for certain, but our survey shows that most other integrated systems in use seem to be expansions of CAMA systems, bolt-ons to Enterprise Resource Planning (ERP) systems, or sub-components of comprehensive tax revenue systems.

Please see the table in **Section 9, Analysis of Alternatives**, *below*, for a listing of statewide deployments by the vendors who proposed solutions to the State.

To take one example, Maine Revenue Services has awarded to FAST Enterprises the replacement of all of their legacy tax systems statewide, that will include Equalization, Real Estate Transfer Tax, and municipal portal, however the contract is yet to be finalized. It is likely to be a 5-year, $72 million project.

We think the New Hampshire example is more comparable to Vermont, in some ways, because of the similar number of municipalities. Although the system was built and improved over time (Axiomatic, LLC is based in New Hampshire), so we cannot evaluate the acquisition costs, we can compare the average annual operating costs.

Table 9 - Comparison of Project Annual Costs

Vermont Avg Annual	$ 161,667.25
New Hampshire Avg Annual	$ 750,000.00

If we consider that New Hampshire's population is over twice that of Vermont; and more importantly perhaps, that property tax is the primary tax revenue source there (as compared to Vermont, where the primary State concern with property taxes has to do with education funding equalization), the above figures seem to be in the same ballpark.

5.3 COST ASSESSMENT:

Are the Acquisition Costs valid and appropriate in your professional opinion? List any concerns or issues with the costs.

Yes. We do note – and the proposal evaluation team noted this as well – that Axiomatic's proposal to Vermont seems very well priced comparison to other bidders. In spite of this, however, our reading of the scoring documents indicate that functionality and usability were probably more important factors in the choice.

Additional Comments on Acquisition Costs:

none

6. TECHNOLOGY ARCHITECTURE REVIEW

Axiomatic's proposed IPTMS solution uses their property tax oversight and administration tool, called PropTax. The vendor claims that the application is the only available Commercial Off The Shelf (COTS) application built specifically for property tax administration. The solution as proposed contains 6 modules:

- Core – platform for all other modules; manages permissions, sign-on, reporting, and system utilities
- QuickRatio – provides sales management and ratio studies
- TaxRate – provides municipal budget creation and tracking; common tax burden apportionment; tax (mil) rate calculation; and financial document tracking
- Eval – configures annual municipal certification information; manages property data; manages site visits and appraisals
- GIS – provides geospatial analysis; valuation verification; dashboards; and field tools (employs ESRI ArcGIS Enterprise – State licensing for ArcGIS is included in the cost summary for this review)
- DataView – provides financial and municipal data graphing and download site (publicly accessible) to promote government transparency; configurable data mining parameters

The solution is presented to users as a web-based, generally agnostic to web browser brand (i.e., works on all State browser preferences). The application is built on industry standard development platforms for web applications, aligned with State preferences for Technology Architecture

- ASP.NET MVC C#
- Bootstrap, Jquery
- SQL database (SQL Server)
- SSIS for data translation/manipulation
- SSRS for reporting
- R statistical engine

The State prefers configurable solutions over customizable solutions. Although the dividing line between the two types can be a bit hazy, in general, configurable solutions are those which are built with existing "switches" or parameters in software, which can be set to meet a customer's needs without re-writing underlying code. Customizable solutions are those which require writing new underlying code or changing existing code to meet customer needs. In general, the PropTax solution will be configurable for Vermont's needs; however, the vendor has identified a few areas where new code may be required (See **Section 7.3.5 Design**, *below*). Any new code would be integrated into the PropTax platform and become part of the COTS solution.

6.1 STATE'S IT STRATEGIC PLAN

DESCRIBE HOW THE PROPOSED SOLUTION ALIGNS WITH EACH OF THE STATE'S IT STRATEGIC GOALS AND ACTIVITIES:

6.1.1 A. Leverage successes of others, learning best practices from outside Vermont

The State, through its project principals at PVR, is a member and active participant in the International Association of Assessing Officers (IAAO), the industry professional membership organization of government assessment officials. Member states and provinces share standards, professional development, and research in property appraisal, assessment administration and property tax policy. The organization has been a source informing this project.

Although States vary in their policy and statutory approach to property tax valuation and management, many of them are dealing with the same issues of aging software, manual processes, and inefficient systems that formed the basis of the current project.

During the procurement process (see **Section 7 Assessment of Implementation Plan**, *below*) the procurement team conducted site visits to other states, to see on the ground how the systems under consideration were performing for customers.

The general assessment of the Project Sponsor as to Vermont's current status of property tax system modernization is that the State is "a little behind the curve." In our view, this probably means the State will benefit from the lessons learned by the earliest adopters.

6.1.2 B. Leverage shared services and cloud-based it, taking advantage of IT economies of scale

To a user of the system (e.g., a lister in a Town office or a PVR analyst), the system will function as a "cloud" application, that is, it will require no special hardware or software other than a generic browser. However, the vendor offers options as to where the application would be physically hosted – options include the State's own datacenter(s) ("on premises" or "on-prem"), the vendor's datacenter, or another commercial cloud datacenter. The State has informed us that it will ask the vendor to deploy the system in an Azure datacenter, thereby meeting State preferences for datacenter reliability and other architectural needs. We strongly concur with this decision.

6.1.3 C. Adapt the Vermont workforce to the evolving needs of state government

The existing system, with its limitations of data manipulation, manual processes, and obsolete software creates significant delays in meeting the statutory requirement of tax policy. For example, the inability of a municipality and PVR to work on the same current use data simultaneously has led to significant delays (several months) in meeting statutory deadlines for current use.

The proposed system will be *much* more efficient in data access and transfer, very likely to be more intuitive, lessening some support burden, and greatly increasing data security and reliability (because of the elimination of manual transfers and some data entry).

6.1.4 D. Apply enterprise architecture principles to drive digital transformation based on business needs

In reviewing the original RFP for this project, we found it to be quite strong on business requirements, but significantly less strong on explicit enterprise architectural (EA) non-functional requirements (NFRs). Perhaps as a result of this, the vendor's proposal was similarly less specific about alignment with State NFRs and EA preferences. This is not to conclude that the vendor was unable to align with these NFRs and preferences, but rather that the proposal was too often silent on these matters.

Early in the present review process, we identified this risk **RISK_ID# _R9_** and conveyed it to our Single Point of Contact (SPOC) and project principals. We noted that an Architectural Assessment (AA) had not been performed on the proposals during the procurement process and expressed the opinion that an AA would be essential to ensuring project success through alignment with State EA principles.

We are pleased to comment that the State did conduct an AA in response to our suggestion. The resulting report as a gap analysis helps to identify architectural strengths and potential architectural weaknesses (or ambiguities) in the vendor's proposal and provides a clear pathway for the resolution of any gaps, by informing NFRs and other EA requirements as they will be included in the contract with the vendor.

Because the contract negotiation is not yet complete, we continue to identify this as a risk. We are not of the opinion that the vendor cannot or will not meet these requirements, only that they have not been adequately addressed. With the completion of the AA, however, we judge the likelihood of non-alignment with NFRs to be quite low, and the risk is well mitigated.

6.1.5 E. Couple IT with business process optimization, to improve overall productivity and customer service

In our view, the State has done, and continues to do, a very deep and productive analysis of business requirements during the procurement and now into the planning process with the assistance of, and meticulously documented by, a State IT Business Analyst. This will connect nicely with the business requirements development work carried out by the vendor and increases the likelihood the implementation of a very efficient and productive IPTMS solution.

6.1.6 F. Optimize IT investments via sound project management

Please see **Section 7.3.1 Project Management** and **Section 7.4 Project Manager**, below.

6.1.7 G. Manage data commensurate with risk

The IPTMS solution is, at core, a data collection, analysis, and manipulation platform. The existing platform introduces serious areas of risk into the process, particularly through manual data transfers and less reliable (and at least potentially less secure) underlying database software platforms.

The proposed solution significantly hardens the security of the whole system, while simplifying and making much more reliable the movement and use of data in the solution.

6.1.8 H. Incorporate metrics to measure outcomes

The project charter identifies 11 project goals with accompanying strategies and success criteria. Some of these are quantifiable, some require more anecdotal assessment, but they all speak to improved customer (i.e., citizen) satisfaction and State efficiency.

6.2 STATE'S ENTERPRISE ARCHITECTURE GUIDING PRINCIPLES

6.2.1 A. Assess how well the technology solution aligns with the business direction

As we stated above, the definition of PVR business requirements for this project is highly developed thus far and becoming comprehensive. The focus on business requirements this early in the implementation planning process should ensure that the deployed solution very efficiently aligns with business needs and realizes obvious efficiencies. It should also minimize the burden on change management processes, including organizational change management and project change management.

6.2.2 B. Assess how well the technology solution maximizes benefits for the state

Although the proposed solution is technological in nature, it is clearly geared toward realizing benefits in *human* processes, at PVR and at the municipalities, and also in external users' access to data and results (through the publicly facing portal). Most especially, it will almost entirely eliminate a whole class of largely manual data transfers and manipulations, by automating them and by integrating them through business process definition and application configuration into the architecture of the system itself.

6.2.3 C. Assess how well the information architecture of the technology solution adheres to the principle of information is an asset

Typically, as we understand it, the principle of "information (data) as an asset" refers to the principle that data will be managed to ensure its accuracy and quality to support informed business decisions. The Architecture Assessment rates Axiomatic's proposal in only the mid-tier for Information Architecture. However, we suggest that much of the responsibility for data management in any case rests with the State. Our understanding is that, at this point, the State does not have a Statewide data governance process in place (although proposals have circulated from time to time, and there is very recently a new Chief Data Officer (CDO)). The 2018 ADS Strategic Plan proposes as an IT outcome supporting the implementation of data governance across State government.[5] PVR is probably too small to have a formal data governance process of its own. It is not clear to us that there is an Information Asset Owner (or SOV equivalent) for this data set.

6.2.4 D. Assess if the technology solution will optimize process

The Architecture Assessment rates Axiomatic's proposal highly with strengths in key areas for Technology Architecture.[6] The State consequently has a high confidence that the technology solution proposed has the components and capability to optimize business processes determined by the State and incorporated by the vendor. We concur with this assessment.

6.2.5 E. Assess how well the technology solution supports resilience-driven security.

The vendor describes the following hosting service in its service level agreement sample:

[5] State of Vermont, *Agency of Digital Services Strategic Plan*, p. 8

[6] *Architecture Assessment Summary*, slide 8

Tier 1 Internet connectivity on a 100mbit port, redundant connectivity to multiple providers, fully redundant power supply and 24/7 service monitoring.

This appears to refer to hosting the application in the vendor's datacenter. (But see **6.1.2,** *above.*) The vendor indicates that the system has "full backup and recovery," but does not indicate that there is, for example, live redundant systems. The Architecture Assessment referred to above can address State requirements for "resilience-driven security" and require that these requirements are agreed and memorialized in contract. At this point, we judge there is more work to be done in this area.

6.3 SUSTAINABILITY

The current Grand List management solution has been in place for over 20 years. It is reasonable to expect that, should the proposed project prove satisfactory, that it will similarly be in use for a long period. The new platform as implemented will be pure Software as a Service (SaaS), meaning that aside from needing a browser and Internet access (and separately a CAMA application in municipalities), users need not install any hardware or any project-specific application software. Upgrades and improvements by the vendor are included in the cost of ongoing maintenance and support. As the solution itself is cloud-hosted, no hardware or State datacenter resources are needed. The platforms on which the solution is built are familiar to the State and align with preferences. Given the question of software escrow mentioned above, the State would be protected in any instance of vendor business failure.

All in all, the solution looks to us to be highly sustainable.

6.4 COMPLIANCE WITH THE SECTION 508 AMENDMENT TO THE REHABILITATION ACT OF 1973, AS AMENDED IN 1998

Comment on the solution's compliance with accessibility standards as outlined in this amendment. Reference: http://www.section508.gov/content/learn.

Vermont.gov has adopted Section 508 and W3C Web Accessibility Initiative standards and guidelines as the benchmark to meet the objectives of the Universal Accessibility for State Web sites policy. These published Section 508 guidelines where published to the federal register on December 21, 2000 and will be implemented in portals by June 21, 2001. The Access Board (the federal board assigned to create Section 508 standards) used the W3C Web Accessibility Initiative guidelines as the benchmark for developing their standards.[7]

The solution as proposed will be web-based and will be accessed by State employees, municipal officials, and – it is anticipated – the general public via an information portal. The vendor's proposal does not

[7] https://www.vermont.gov/policies/accessibility, accessed January 14, 2020.

address section 508 or W3C Web Accessibility standard. It is typical that vendors providing web-based services to governments are familiar with these standards, and we expect that will be the case here. However, we do recommend that the State explicitly require these standards where appropriate through the contract negotiation process.

6.5 DISASTER RECOVERY

Axiomatic provides cross-training to state IT staff regarding systems operations, maintenance, and disaster recovery. Full documentation of regular system operations is provided including full data dictionary, installation documentation, and playbooks for system maintenance tasks. Axiomatic conducts disaster recovery drills every December where systems are fully restored from backups. Full backups are created nightly, and incremental data backups are maintained every 15 minutes.

The vendor adheres to security best practices with each major client release having security and penetration tests performed by a third-party security firm prior to go-live. For applications hosted by the vendor systems backups can be loaded to a state resource to ensure PVR has operational control over its data assets. The full PropTax codebase may also be placed in escrow with the state of Vermont as the named beneficiary.

Axiomatic conducts disaster recovery drills every December where all applications are fully restored to a new environment from backups. Axiomatic maintains full nightly backups to a cloud location which can be restored within an 8-hour window of failure. Axiomatic also maintains incremental 15-minute database backups, which can be restored if the physical infrastructure has not been destroyed.

For the loss of an OSE, the VM is restored from a known good snapshot or backup and any structured or bulk data lost is restored from the latest available backups. In the event of the loss of the physical hosts or the facility, VMs are re-provisioned on physical hosts at a different location and data restored from cloud-based backups. DNS is repointed to the new hosts, if needed.

Database (structured data) Recovery Point Objective (RPO) 24 hours, Recovery Time Objective (RTO) is 24 hours. Bulk data (filesystem) RPO 24 hours, RTO 24 hours.

In general, these practices are in alignment with State preferences and expectations at this point in the project. As the project proceeds, an explicit disaster recovery plan with full State participation and appropriate decision making should be developed.

6.6 DATA RETENTION

Database and filesystem backups have a minimum retention period of 12 months.

The proposed system is built on a secure and reliable DBMS platform (SQL Server). The State may define the public data retention schedule. Tax Increment Management functionality includes a 20-year property tax retention period.[8]

6.7 SERVICE LEVEL AGREEMENT

6.7.1 What are the post implementation services and service levels required by the state?

The State's RFP requested bidders to include a sample Service Level Agreement (SLA); the State did not specify service levels in the RFP. However, we note that this system has a wide and varied user base among the officials of municipalities and staff at PVR, and it also represents enables a very large (around $ 1.5 billion per year) revenue, so we would expect an uptime level near 100% and associated support sufficient to meet the users' needs.

The vendor's sample SLA (proposal attachment #8) provides definitions of support hours and problem/issue severity codes, as well as response times and prioritization for defect correction.[9] The sample agreement does not define required system uptime, recovery time objectives, recovery point objectives, or work recovery time, although objectives for all of these *are* included in the vendor's sample Implementation Plan (proposal attachment #6).[10]

The sample SLA does include support hours (weekday business hours), and the relevant PVR staff (District Advisors) advise us that these support hours are adequate for municipalities.

6.7.2 Is the vendor proposed service level agreement adequate to meet those needs in your judgment?

We think that the vendor's *sample* SLA *does not* meet the State's needs.

Firstly, it does not contain definitions of performance objectives such as uptime, etc., as described above, including definitions of measurement and reporting.

Secondly, it does not include remedies to compensate the State if service levels are not maintained. The vendor does mention in their proposal (not in the sample SLA), "For instances where Axiomatic performance deviates from the standard, the amount of compensation shall be determined to the

[8] Axiomatic, LLC, *20190410 Axiomatic Official IPTMS Submission,* p.28

[9] *Ibid.,*.p. 196

[10] *Ibid.,*.p. 175

mutual satisfaction of the client and Axiomatic as a percentage of the total deliverable."[11] We think this statement is vague and, importantly, not included in the sample agreement (therefore potentially not enforceable).

We recommend that the State negotiate clear and specific performance levels and remedies for any failure to meet those levels. We prefer remedies that are financial in the form of rebates or service credits. The levels of service and the nature of remedies are a matter for the State to determine in negotiation with the vendor, but they should be agreed in contractual form.

6.8 SYSTEM INTEGRATION

IS THE DATA EXPORT REPORTING CAPABILITY OF THE PROPOSED SOLUTION CONSUMABLE BY THE STATE?

Yes, and in several ways:

- The proposed solution employs State-preferred methods of data transfer, i.e., RESTful APIs, for data interchange, eliminating deprecated manual or batch methods
- Previously separate systems such as Microsoft Access databases, are eliminated for processes within the solution
- The State is still able to extract data from the solution in order to perform analysis in its own separate databases through common data extract processes
- A public portal will simplify reporting for external users. For example, under the current system, external users requesting the Grand List are given a physical disk containing the data. With the proposed solution, such data can be accessed and retrieved through the solution portal

WHAT DATA IS EXCHANGED AND WHAT SYSTEMS (STATE AND NON-STATE) WILL THE SOLUTION INTEGRATE/INTERFACE WITH?

Data will be exchanged (sometimes in one direction, sometimes in both) between the PropTax solution and its modules and at least:

[11] *Axiomatic Proposal,* p. 62

Table 10 - Data Integration

Integration System	Purpose
eCuse	Current Use Enrollment
Fast Enterprises (GenTax)	Homestead Declarations Input Property Tax Adjustment Payments Input
CAMA (Patriot)	Grand List Data Sync Exemption Sync Sales Validation & Import (Equalization)
CAMA (MicroSolve & Others)	Grand List Data Sync Exemption Sync Sales Validation & Import (Equalization)
Tax Billing	Tax Bill Transmission
Esri ArcGIS Enterprise	Parcel Maps
Additional Integrations	TBD, following completion of business analysis

Please create a visual Please create a visual depiction and include as Attachment 1 of this report.

[See attachment 1]

Will the solution be able to integrate with the State's Vision and financial systems (if applicable)?

N/A

Additional Comments on Architecture: ***none***

7. ASSESSMENT OF IMPLEMENTATION PLAN

OVERVIEW

The vendor has proposed an implementation schedule that is approximately 2 years long. If the State executes a contract soon after this Review, as is hoped, that schedule will coincide roughly with the calendar (not fiscal) year. (The vendor's sample implementation milestones table covers a 27 month period from kickoff meeting to final module certification, but it does not seem unlikely that the schedule could be condensed somewhat.)

There are two major constraints to the implementation timetable. The first is that cutover to a new system should coincide as much as possible with the municipalities' need to submit and use data, which follows roughly a calendar year. Many municipalities have limited time and personnel resources and must also turn their attention to matters other than property tax evaluation, such as elections (2020), town meetings, and other important internal matters. The second constraint is the desire to avoid the expense of excessive parallel operation of the existing system with the new system.

To implement within these constraints, we like the general approach of using the first year to refine business requirements and design the system, and the second year to develop and implement. The municipalities will need to be involved minimally during the 2020 cycle, where most of the work will take place within PVR. In the beginning of the second year, a handful of municipalities representing a good cross-section of geographic and size distribution will participate as "beta testers," as the vendor develops and refines modules to meet business and usability needs. This will include "look and feel," as the State's District Advisors – those PVR staff most closely assigned to assisting the municipalities' users – have told us that they like the capability of the new system to look and feel as much as is practical to the existing system for the users, to maximize the effectiveness of training and adoption.

VENDOR PROCESS

The vendor's project management and development process employs a "hybrid waterfall/agile" methodology. In this model, the major modules of the system – PropTax Core, Eval, RatioStudy, TaxRate, and DataView – are configured, tested, and certified to an implementation milestones schedule. This is the "waterfall" portion of the methodology – once a module is tested and accepted, it is "done" and ready for deployment. Within the configuration of each module, however, an iterative Agile process is employed, using quick sprints to meet evolving needs. We think this hybrid approach is appropriate: The Agile methodology is fast, flexible, and adapts to changing or refining needs. The waterfall methodology provides a more transparent and definitive way for the State to evaluate the status of the implementation process and timeline.

TIMELINE

The vendor describes the technical implementation timeline in terms of 3 phases: Planning, Design & Configuration, and Testing. The Planning phase corresponds roughly with the first year; Design & Configuration and Testing phases with the second. The following table is excerpted from the vendor's original proposal. As the expected date of contract execution has changed, we have converted the vendor's suggested Month & Year dates into number of months from the "kickoff" meeting.

Table 11 - Vendor Timeline and Milestones

Planning Phase Milestones	Month of Completion
Kick-Off Meeting	1
Project Documentations	1
Stakeholder Outreach Plan	1
Existing Process Document	3
Gap Analysis Document	7
Business Process Requirements Document	6
Technical Requirements Document	10
Development and Configuration Phase Milestones	**Month of Completion**
Development and Config Commence-Eval	13
Development and Config Commence-RatioStudy	11
Development and Config Commence-TaxRate	13
Development and Config Commence-DataView	23
Certified Build-Eval	24
Certified Build-RatioStudy	19
Certified Build-TaxRate	23
Certified Build-DataView	26
Testing Phase Milestones	**Month of Completion**
Test Plan Complete	11
Internal Testing Certification-Eval	25
Internal Testing Certification-RatioStudy	21

Internal Testing Certification-TaxRate	24
Internal Testing Certification-DataView	27
UAT Test Scripts-Eval	24
UAT Test Scripts-RatioStudy	20
UAT Test Scripts-TaxRate	23
UAT Test Scripts-DataView	26
Certification of UAT-Eval	25
Certification of UAT-RatioStudy	21
Certification of UAT-TaxRate	24
Certification of UAT-DataView	27
Certification of Security Testing-Eval	26

BUSINESS ANALYSIS AND SCOPE

Throughout the RFP development process and continuing through the selection and post-selection procurement stage, the State has been conducting a very good and detailed business process analysis with the assistance of, and meticulously documented by, an ADS IT Business Analyst. The resulting understanding of PVR/Grand List business processes should dovetail nicely with the vendor's gap analysis and business process requirements determination phases, as well as in development of user "stories" and test cases, which will be necessary in the testing and evaluation phases of development.

As detailed understanding of business processes have evolved, there is a possibility of some expansion of scope (e.g., perhaps in integration with Agency of Education data).This could well be to the benefit of the State, but there is currently no formal project/scope change management mechanism in the project. We identify this as a risk. **RISK_ID# _R2_** We recommend the State ensure creation of project/scope change management process within project team, with links to Executive Sponsorship, vendor, and any appropriate stakeholder(s).

The State agrees and explains that the project scope will be baselined by contract attachment A and the exhibit with project requirements. The contract will outline a change management process and a change management plan that describes the detail of that process will be developed by the Project Manager. We concur with this mitigation plan.

After assessing the Implementation Plan, please comment on each of the following.

7.1 THE REALITY OF THE IMPLEMENTATION TIMETABLE

The implementation timetables are proposed by the State and by the vendor seem to us to be realistic and appropriate, as well as aligned with each other. In particular, we think these features are good:

- The first year of implementation planning is largely "within" PVR, minimizing impact on municipalities
- The first year of contract aligns roughly with the calendar year, and the hosting process aligns approximately with the fiscal year – meaning that ongoing operations should match with FY.
- With a 2-year implementation window, appropriate time is given to business requirements development, configuration, testing, and deployment

7.2 READINESS OF IMPACTED DIVISIONS/ DEPARTMENTS TO PARTICIPATE IN THIS SOLUTION/PROJECT

(consider current culture, staff buy-in, organizational changes needed, and leadership readiness).

Enthusiasm for this project with PVR is consistently high, driven mainly by frustrations experienced working with the outgoing, obsolete system; but also by a positive experience of the selected vendor's demo session and a site visit to New Hampshire to view the Axiomatic solution in a live, comparable setting.

It is widely anticipated within the project and among stakeholders (e.g., in municipalities) that procedures to accomplish common tasks will change significantly in the transition to the new system. The capability of the new system to accommodate "look and feel" characteristics of the existing system may smooth this transition, but there is no doubt that many tasks will change in what will be a relatively rapid changeover to the new system. Mostly, these changes will accompany much more efficient and intuitive processes; however, the user base is large (including users in the municipalities) and not necessarily technologically proficient. There is no dedicated Organizational Change Manager associated with the project, although there is a dedicated communication resource, which somewhat addresses this. We identify this as a risk. **RISK_ID# _R3_** We recommend that the State ensure availability of appropriate Organizational Change Management resources and continue to develop an explicit OCM plan. If the communication resource is to be the OCM point person, ensure that s/he has sufficient access to those resources.

In response to this risk, he Tax department has a dedicated resource specifically for this project, that will be working directly with municipalities and communications around this project. The tax department will also leverage their POLA (Policy Outreach and Legislative Affairs) unit to help with communication to the towns as they have established relationships and communication channels with them already.

We find this mitigation likely to be adequate, as long as an explicit OCM plan is developed through the project management process.

Technology, broadband access, and technical expertise might be limited in some municipalities, potentially limiting or otherwise affecting efficient use of the new system, as is widely acknowledged within the project. To realize the benefits of the project, as well as to properly husband support resources, it will be important to avoid as much as practicable a reversion to deprecated manual methods, which could delay implementation of the system and frustrate users. We identify this as a risk. **RISK_ID# _R5_** We recommend that the State assess municipalities' capabilities during the development year (2020) and develop a plan to remediate these limitations in advance of go-live.

In response, the State agrees with the recommendation and notes that some of this information has already been collected through a survey that was done with Vermont Leagues of City and Towns and the State plans on continuing this work to come up with a plan to best support those towns that may be lacking from a technology standpoint. We find this to be a good response.

In our discussions with project personnel, we came to understand that certain key project knowledge is held by one Subject Matter Expert (ADS IT Support for Grand List Solution) and this knowledge is not necessarily accessible in documentation. Unavailability of this person (who also has other responsibilities as well) for any reason could result in delay if the knowledge must be reconstructed from other sources. (We point out that this dependence was identified by project members well in advance of this review, and discussions were underway to mitigate it the risk.) We identify this as a risk. **RISK_ID# _R1_** We recommended that the State provide redundancy through knowledge transfer, e.g., by devoting some personnel resource to "shadow" this SME.

The State response is to “agree to an extent.” A new resource will be shadowing the current resource on the new build, but they do not have the bandwidth to knowledge transfer everything that goes on in the current system. We agree with this mitigation: there is naturally a limit to how much resource you want to devote to a deprecated system that will soon go away entirely. The State’s response is reasonable.

7.3 DO THE MILESTONES AND DELIVERABLES PROPOSED BY THE VENDOR PROVIDE ENOUGH DETAIL TO HOLD THEM ACCOUNTABLE FOR MEETING THE BUSINESS NEEDS IN THESE AREAS:

7.3.1 A. PROJECT MANAGEMENT

The vendor identifies the following standard deliverables for project management (PM). The vendor’s description of each deliverable (as found in the proposal) is adequately detailed and aligns well with the State’s PM deliverables expectations, based on Project Management Book of Knowledge (PMBOK) principles. These deliverables would be continuously available to the State (after they are created) in a shared document repository. We expressed some concern that the vendor proposed a document repository not normally used by the State; but we are informed that the State will require the vendor to use a standard SharePoint site with full access by the State.

- Project Charter
- Project Management Plan (PMP)
    - Change Management Plan
    - Communications Management Plan
    - Requirements Management Plan
    - Human Resources Management Plan: RACI (Responsible, Accountable, Consulted, Informed) Matrix.
    - Procurement Management Plan (uses language normally supplied by the State)
    - Quality Management Plan
    - Scope Management Plan
    - Project Schedule
    - Training Management Plan (TMP)
- Action Item Register
- Project Dashboard
- Status Reports:
    - Staff Assignments
    - Accomplishments
    - Upcoming work/tasks
    - Issues with proposed/actual resolutions
    - Budget status
    - Risks and mitigation strategies
    - Change orders

7.3.2 B. TRAINING

The vendor identifies the following high-level deliverables for training. The vendor will provide both in person and web-based training to PVR staff as well as municipal listers, tax collectors and other external stakeholders as appropriate. Recorded training will be available 24/7 to PVR and municipal stakeholders as well as quick-help guides, frequently asked questions (FAQs), and a complete online knowledgebase. A sample of a knowledge base has been made available online by the vendor for the State's perusal. The vendor will also supply phone and email support during business hours once the system is implemented. Annual training (retraining) will be provided to PVR and municipal staff as appropriate.

We think this description of deliverables is adequate and appropriate at this stage of engagement. However, as the vendor's own proposal points out, State PVR staff (District Advisors) would be expected to also play a role in training and support at the municipality level, which could strain resources as they are currently deployed. We do not think the State has as yet adequately planned in detail for the resources needed for this type of training, and we identify this as a risk. **RISK_ID# _R4_** The strain in resources can be in the form of personnel time as well as travel time. In our conversations, the District Advisors have made some suggestions they think would alleviate the situation, in the form of additional

personnel and/or personnel dedicated to phone support and "triage." (e.g., if a lister in a municipality is found to need extensive in-person support that might take a whole afternoon instead of a brief visit) We acknowledge that there are very few problems in State operations that would not be solved by hiring more staff, and so we are not making specific personnel recommendations, for which we could not at any rate see "the whole picture." Instead, we recommend that the State make use of the initial (2020) implementation year to plan comprehensively for training needs and resource deployment.

Training deliverables:

- Training Plan
- Training Materials (PowerPoint)
- Training Videos (recorded training sessions)
- Conduct training sessions
    - State
    - Municipal
    - Public

Online Knowledge base (help documentation)

7.3.3 C. TESTING

The vendor's technical proposals and description of testing processes demonstrate a good familiarity with these processes and are fully adequate for this stage of engagement. The vendor identifies the following technical services and describes them (in the proposal) in appropriate detail:

- Internal Testing
    - Unit Testing
    - Smoke Testing
    - Quality Assurance Testing
    - Regression Testing
- User Acceptance Testing (UAT) – for internal (PVR) and external (e.g., municipality) stakeholders
- Installation Testing
- Integration Testing
- Security Testing – employs appropriate standards, i.e., NIST 800-171 and NIST SP800-53 Moderate Risk Controls

The deliverables for the testing services include an overall Test Plan, UAT test scripts and support, and certification (including third-party certification) of completion of all testing services.

PVR will be involved in User Test Case development for all UAT testing, utilizing the business process analyses and stakeholder input already gathered, as well as further input and beta testing feedback.

7.3.4 D. DESIGN

As mentioned in the Architecture section above, the State prefers COTS solutions, and configuration over customization. The vendor not inappropriately describes its solution as COTS but acknowledges that adapting it for Vermont may require some development (i.e., customization) beyond configuration. To their credit, they have identified the areas where this is likely, and relatively speaking, it should be quite limited. In the description of technical services, the vendor describes gap analysis this way:

> *Axiomatic will compare the business requirements with existing PropTax COTS functionality to establish functional gaps. It is anticipated that these gaps will primarily revolve around TIF management, Exemption Management (and current use), and Tax Bill Generation. Functional gaps will be documented and become the basis for technical design and development of required PVR functionality. Gap Functionality will be included in the business requirements document*.

In our opinion, this limited amount of customization is not unusual in an industry where customers (states) are very limited in number and have widely varying needs based on local statutory requirements. Most of the development process will be configuration. The vendor's development methodology (Waterfall/Agile) – described in the implementation overview above – provides for regular check-in with the State to demonstrate functionality.

Aside from the solution itself, the deliverables of the design process include the functional gap document, the technical requirements document, "conference room pilots," and certification of completion of development.

Vendor, while experienced, is a relatively small technology company. Much of the new system code will be configured specifically for Vermont, and some development of code may be Vermont specific. If for any reason vendor ceased business, Vermont could lose access to code necessary for future configuration (e.g., in light of statutory changes). We identify this as a risk. **RISK_ID# _R7_** The vendor has offered software escrow with Vermont as the beneficiary, and we strongly recommend that State take this option. It is unclear at this point if this would be at additional cost.

The State has agreed to this mitigation.

7.3.5 E. CONVERSION (IF APPLICABLE)

The existing system, taken as a whole, includes the data in the NEMRC platform as well as data in PVR's Access databases. This data will need to be extracted from the existing system(s) and loaded into the new solution, with a minimum of information loss, which could potentially happen from the way data fields are defined in the source system, and/or by the way data fields are defined in the new system. The general process by which this is done is termed Extract-Transform-Load (ETL), and is a process of extracting ("dumping") data from the source, manipulating it so that it conforms to new requirements without loss of information, and then loading it into the new system, followed by rigorous testing for reliability.

The vendor will employ SQL Server Integration Services (or software equivalent) to manage ETL processes. PVR staff will be consulted throughout to ensure appropriate and verifiable data conversion. Some technical aspects of the process are low-risk, because both the existing system main platform (Foxpro) and the "desktop" databases (Access) are well-known and well-documented products. However, data conversions are generally most problem-free when the designer of the original system (in this case NEMRC) cooperates where necessary with the new vendor. In this case, the level of cooperation to be expected is unknown, and therefore we identify this as a risk. **RISK_ID# _R6_**

We note, however, that the new vendor has had productive experiences working with the incumbent vendor on data integration, and we do not rate the likelihood of problems very high. Additionally, the incumbent vendor continues to do business with municipalities, and we should expect cooperation with the State.

The State in response notes that it is aware of this and is working on collecting 2019 Grand list data with towns and current vendor and will have a complete backup by the end of February 2020. Once that data is finalized, this becomes a non-risk. We concur with this assessment.

The project vendor identifies the following deliverables for data conversion, and these seem appropriate to us:

- Data Conversion Plan & Test Metrics
- Data Conversion UAT Scripts
- ETL Processors

7.3.6 F. IMPLEMENTATION PLANNING

Implementation planning for module development is described in Section **7.3.4 Design**, *above*. During this planning phase, the vendor will also provide many of the required project management deliverables detailed in Section **7.3.1 Project Management**, *above*, as well as

- Existing Process Document (Diagrams & Documentation)
- Future Process Document (Diagrams & Documentation)

- Business Requirements Document
- Functional Gaps documented within business requirements document
- Technical Requirements Document
    - Wireframes
    - Documented Business Logic
    - Database Design & Field Mapping

Taken as a whole, these deliverables reflect Project Management and Implementation Planning best practices and standards. We think they are comprehensive in scope and likely to be effective in keeping the State informed of the status of project progress and of design decisions.

7.3.7 G. IMPLEMENTATION

The implementation deliverables include all those listed in **Section 7.3.3 Testing**, above; **Section 7.3.5 Data Conversion**, above; **Section 7.3.2 Training**, above; and **Section 7.3.1 Training**, above.

In addition, the following represent the actual cutover and final certification deliverables:

- Deliverables certification
- Close out meeting minutes & lessons learned

The vendor's implementation deliverables represent industry best practices and align with the State's expectations. Altogether, they are adequately comprehensive, well-staged, and should serve the State well.

7.4 DOES THE STATE HAVE A RESOURCE LINED UP TO BE THE PROJECT MANAGER ON THE PROJECT? IF SO, DOES THIS PERSON POSSESS THE SKILLS AND EXPERIENCE TO BE SUCCESSFUL IN THIS ROLE IN YOUR JUDGEMENT?

Yes. The ADS Project Manager assigned to this project is well-qualified and certified, has worked on similarly large projects for the State and in another state as well as in industry. She has a comprehensive view of the project's needs and challenges. She feels that the project principals hear and use her advice, and those principals in turn expressed appreciation the input and assistance of this project manager and of the earlier one she replaced on this project. The documentation that earlier PM helped to create, as we have examined in the project's document repository, was well-structured, appropriate, and aligned with State preferences and expectations.

We have no doubt that the current Project Manager will be effective for this project.

Additional Comments on Implementation Plan

none

8. COST ANALYSIS AND MODEL FOR BENEFIT ANALYSIS

8.1 ANALYSIS DESCRIPTION:

Provide a narrative summary of the cost benefit analysis conducted.

The primary drivers for this project are increasing system efficiencies and reliability (by eliminating obsolete software and automating manual processes; and increasing business efficiencies (by automating data manipulation and transfer processes and increasing usability). Cost saving was not an original goal, although the selected solution will be less expensive to operate annually.

From project documentation, including especially the Charter; interviews; and analysis of the technology, we derived the summary lists that follow.

8.2 ASSUMPTIONS:

List any assumptions made in your analysis.

- That business process inefficiencies both at PVR and in the municipalities are largely due to the characteristics and obsolescence of the existing system. We strongly believe this is so, and it is a widely held belief within PVR, but of course the evidence is anecdotal. (The structured analysis of business processes currently being conducted is rigorous, however, and should support this view)
- That vendor costs will largely align with those stated at the time of the BAFO

8.3 FUNDING:

Provide the funding source(s). If multiple sources, indicate the percentage of each source for both Acquisition Costs and on-going Operational costs over the duration of the system/service lifecycle.

Funding for the proposed project is 100% State funding. No federal or other grant funds are used.

The State funding source is Fund 21594, a holdback from Property Transfer Tax kept for Current Use/PVR Computer systems improvements per statute.

8.4 TANGIBLE COSTS & BENEFITS:

Provide a list and description of the tangible benefits of this project. Tangible benefits include specific dollar value that can be measured (examples include a reduction in expenses or reducing inventory, with supporting details).

- **Savings of *annual* operation and maintenance (O&M) costs of approximately $72,380.**

*(Note: This does not include implementation costs. Please see **Section 9 Cost Impact Analysis**, below.* **)**

8.5 INTANGIBLE COSTS & BENEFITS:

Provide a list and description of the intangible benefits of this project. Intangible benefits include cost avoidance, the value of benefits provided to other programs, the value of improved decision making, public benefit, and other factors that become known during the process of analysis. Intangible benefits must include a statement of the methodology or justification used to determine the value of the intangible benefit.

	Goal	Success Criteria	Independent Reviewer's Assessment
1	Improve efficiency in the Grand List software for State and external users when inputting data and extracting reports for State use across Agencies and Departments, legislative use, municipality use and other external stakeholders.	All standard Grand List data reports and public-access portal will be available on or before 12/31/2021.	**Likely to be accomplished. Aligns with project requirements and implementation timetable.**
2	Improve accuracy of all the data products to all the Stakeholders.	Improve accuracy by reducing errors, corrections and omissions annually by at least 5%.	**Difficult to quantify, but likely. May be measured anecdotally.**

3	Greater transparency in governance, auditability and process documentation	That there is more accessibility by State users to governance of the new system, as well as easier audit processes and more readily available and accurate documentation for users.	**Very likely.**
4	Implement expanded capabilities and close the delta between the current system and desired capabilities.	Establish current state capabilities and, with stakeholders, establish must-have capabilities that new solution is required to meet. Gap Analysis to be done in order to establish the success criteria for new solution.	**Internal business analysis and documentation already underway makes this very likely.**
5	Improve reporting abilities and provide equal, accurate and real-time access to public data to all.	State users, Municipalities and external users have the ability to run accurate reports based on the real- time public data that is kept in the new system without vendor consultations, District Advisor involvement or other issues.	**Very likely.**
6	Make accurate Property Tax System data accessible to the public and other stakeholders on-demand.	Standard Grand List data reports and Public-access portal will be available upon completion on or by 12/21/2021.	**Same as #1.**
7	To improve and enhance enforcement of dynamic statutory requirements.	All Standard Grand List Data Reports and Public-access portal will be available on or before 12/31/2021.	**Same as #1.**

8	Meet the Individual and Collective Needs of a Diverse Cross-Section of Stakeholders	Identified requirements will be met by the solution.	**Vague.**
9	Reduce or eliminate labor and expense resulting from non-automated data exchanges among municipalities, the State and other stakeholders.	One (or more) State FTE (across individuals) will be freed up to carry out proactive or more focused activities. As the result of system automation and process improvements the equivalent of one (or more) full-time State staff-person (one FTE) will be made available to engage in proactive planning and administrative activities.	**Some cost avoidance is likely by re-assignment or re-focus of staff on more efficient activities. Estimation of amount of cost avoidance is difficult at this stage but may be quantifiable after implementation. At any rate evidence of increased efficiencies will be available by that time.**
10	Upon login, municipal officials will have immediate access to needed information synchronized with other state systems	The level of effort which Municipal Officials expend to perform grand list maintenance will be reduced by at least 10% annually.	**Very likely. Quantifiable by sampling.**
11	Consolidate and synchronize property tax information currently managed by several non-integrated systems.	Errors, Corrections and Omissions are reduced by at least 5% annually.	**Likely and measurable.**

To the list above, we would add:

- **Increase in system reliability, due to retirement of obsolete software and reduction of manual processes.**
- **Increase in system and data security and privacy, due to improvements in technology and hosting for new system.**
- **Some reduction in Microsoft Access and SQL Server license costs, possibly $10-15,000 per year.** (Estimate by VDT Director of Finance)
- **Possible reduction in training costs for municipality listers.**

8.6 COSTS VS. BENEFITS:

Do the benefits of this project (consider both tangible and intangible) outweigh the costs in your opinion? Please elaborate on your response.

Considering that the drivers of this project are increasing reliability and process efficiencies, and that continuation of the use of the obsolete platform is not a realistic alternative, we consider that the benefits outweigh the costs clearly and definitively.

8.7 IT ABC FORM REVIEW:

Review the IT ABC form (Business Case/Cost Analysis) created by the Business for this project. Is the information consistent with your independent review and analysis? If not, please describe.

The IT ABC form[12] aligns reasonably well with the project business case but is well off the mark financially. This is not so surprising, giving that the form was developed and approved quite early in the project's history, before VDT/PVR staff had a good idea of the vendor landscape.

The estimation of costs for implementation were $11,880,920 compared to the determination of this report for implementation costs of $1,373,885, only about 12% of the estimated amount. The estimation of total annual operating costs was $939,320, compared to the actual costs of (average) $161,422, only about 17% of the estimated expected annual cost. By this measure, the State has got itself a bargain.

The IT ABC form costs for the current solution are $170,320, compared to the current estimate of $233,801. However, it appears this is due to some changes in cost since the form was approved.

As a result of the differences described above, the estimation of the Net Impact to State Costs differs significantly from the impact of the project as proposed. The IT ABC form estimated a net impact of $16,958,947.60 over the 5 year lifecycle of the project. Our estimation using the data in the current review (see **Section 9 Impact Analysis On Net Operating Costs**, *below*) shows a net impact of $1,011,989.00, a **$15,946,958.60 improvement over the IT ABC form estimate.**

Additional Comments on the Cost Benefit Analysis:

none

[12] *IT ABC Form*, p. 4-6

9. ANALYSIS OF ALTERNATIVES

OVERALL PROJECT APPROACH ALTERNATIVES

In response to the business case driving the present project, the State might have elected a number of alternative approaches. We briefly assess these possible approaches in light of the realities of the project and of State IT strategic preferences:

- **Continue** (*Make no significant changes; continue to use the existing system*.)
  This is the default position in most modernization discussions. If the current system can be used, perhaps with minor modifications or additions to "patch" inadequate functionalities, this is sometimes the lowest risk approach, due to a known system, vendor and cost, with no implementation period with its attendant risks. **In the present situation, however, the incentive for this project is not just a desire for modernization, but rectification of serious shortcomings in the existing system: of reliability, sustainability, and functionality, as well as potential security issues. In this instance, we judge this approach as unfeasible for all but a brief transitional period to a more modern and sustainable solution.** The current vendor submitted a proposal in response to the RFP that would essentially move the existing system's functionality to a more modern platform but continues the existing functionality without significant improvements to business requirements.

- **Build** (*Develop a new system from "scratch" to exactly meet State requirements*.)
  Developing a new system from "the ground up" is an approach used by some states when existing products in the marketplace cannot meet the state's requirements, even with customization. It normally requires that a state has deep and experienced internal development resources to build, test, deploy, certify, and maintain a custom solution. Although the State of Vermont has sometimes used this approach in the past to develop software solutions, it is now considered inadvisable and deprecated, for several reasons: (1) SOV does not have extensive internal development resources (aside from development of configurable applications such as Microsoft Access); (2) Custom solutions generally suffer from a sustainability problem, being difficult to change to meet new technical or statutory requirements, as well as requiring a continuing skilled development staff to operate, maintain, and support — leading to the State's preference for Software as a Service (SaaS) solutions; (3) Custom solutions, if well-built, tend to be much more expensive than "Commercial Off-The-Shelf" (COTS) solutions; (4) Custom solutions are inherently difficult to transition to a new system, when the need arises. **We judge this approach to be strongly inadvisable for the State. The IPTMS solution marketplace, while still maturing, is reasonable active, and a number of practical COTS solutions have emerged. The International Association of Assessing Officers (IAOO) has very recently created a tool to help members develop RFPs for projects such as the present one, and this will likely**

encourage further development of COTS solutions in this field. There seems no reason for the State to elect a custom solution.

- **Buy** (*Request proposals from competing vendors and select the best option*.)
  This is the approach employed in the present proposed project and solicited via the RFP. It assumes the existence of a COTS product in the marketplace that can fulfill the State's business and technical requirements for a reasonable price and with a practical amount of configuration. The State prefers solutions that can be configured without extensive customization (as customized products are vulnerable in many of the same ways as fully custom solutions). Most of the State's Non-functional Requirements (NFRs) assume a COTS solution. **We judge this to be the best approach in the present project, because it appears to be (1) highly effective in meeting the State's business requirements; (2) compliant with the State's NFRs; (3) potentially very cost-effective, depending on the proposed pricing, and requiring a minimum of State personnel for ongoing maintenance.** As described elsewhere, the selected vendor's solution meets all of these points.

- **Extend/Integrate** (*Use an existing SOV software platform and expand it to meet State IPTMS requirements*.)
  This approach requires an existing State software solution that could potentially be modified and enhanced to fulfill the business requirements of the project. An advantage of this approach is an enhancement of data integration within the State enterprise. A disadvantage is that it is reliant on the vendor's familiarity and experience with software meeting the newly added business requirements. This approach can be a subset of the "Buy" approach described above, and in fact the vendor of an existing State software solution, the "VTax" solution provided by FAST Technologies, offered such an approach. The State judged this proposal to be somewhat risky because of the vendor's inexperience specifically with IPTMS systems; but in particular the cost of the proposal rendered it unfeasible under current State funding. **We judge this approach to be feasible for the State on technical grounds, but the State did not receive a proposal of this type that was financially viable under current funding.**

- **Wait** (*Use the existing system while anticipating that better products or solutions will become available in time.*)
  The approach of deferring action until better solutions appear may be advisable when (A) the existing solution is satisfactory, if not ideal, *and* (B) better technical and/or cost-effective solutions are anticipated in the marketplace. In the present instance, the first requirement is demonstrably not true: The State feels the imminent need to act to replace the current system, and we concur. The second requirement assumes some lack of satisfaction with the selected proposal — we have not detected any dissatisfaction. This is not to say that there are no newer systems on the horizon: the procurement team found that some of the other proposals, for example, had "exciting" possibilities for enhanced functionality, although from vendors that had

not yet demonstrated deep experience. Similarly, it is possible in the future that the VTax vendor mentioned above may develop IPTMS functionality as part of its core product through work in other states like Maine, and perhaps the cost could become more practical for Vermont. However, that is speculation. **Given the risks of the existing system, we judge that the State should not wait for potential improvements in the IPTMS software market.**

ARCHITECTURAL ALTERNATIVES

Given the State's explicit preference for cloud-based solutions, and the preferences implied by the NFRs, any solution chosen by the State would almost certainly reflect the same general architecture as that proposed by the selected vendor, i.e.,

- a cloud-based, SaaS solution,
- hosted in secure, recoverable facilities,
- accessible by users via web/mobile interface,
- with minimal impact on SOV network resources,
- employing a database backend that meets SOV requirements and preferences.

Additionally, given the constraints of the present project, the solution would have to be CAMA-agnostic, to the greatest practical extent.

The only major architectural divergence might be if the solution were integrated into an existing solution that served other SOV business needs as well, such as a comprehensive tax system or an Enterprise Resource Planning (ERP) system. (as explained in **Expand/Integrate**, above).

POSSIBLE ALTERNATIVES IN THE EVENT OF PROJECT FAILURE

We have assessed the risks in the proposed project to be low to moderate. However, there is always the possibility that the State may terminate a project once underway for unforeseeable reasons. Here we consider what the State might do, should such a situation come to pass.

The proposed implementation plan envisages the concurrent operation of the existing system with the new system under development, so even in the event of a terminated implementation, the State would not be without a functioning system. Internal State processes would determine exactly the sequence of what would happen next, but in our view, this would present a choice of three alternatives:

- **Retain the current system (i.e., Continue)**
  This remains a high-risk alternative, as described repeatedly above.

- **Re-start, or re-open, the RFP process**
  The selected vendor was not the only high-scoring alternative in the proposal evaluation

process, so are feasible alternatives available, both in cost and in functionality. **This might be a hard sell following an implementation termination. However, the survey of state and county implementations below show that Tyler Technologies predominates – one alternative would be to reconsider the Tyler proposal with a view to lowering the cost and/or increasing funding**.

- **Engage the current vendor to migrate the existing system to a more robust platform**
  This is a practical approach, although we would suggest that our interviews with project personnel suggest that enthusiasm for it would be low, due to perceived low satisfaction with the current vendor.

- **Engage the VTax vendor to develop the IPTMS system as an extension/enhancement of the existing VTax system (i.e., Extend/Integrate)**
  This too is practical. It has the advantage of employing a vendor whose work is known and satisfactory, and an existing platform with which the State is familiar; it has the disadvantage of vendor inexperience with IPTMS *per-se* (although this might have changed by that time), and the significant disadvantage of high cost. **All things considered, although a project failure is never a good situation, in that event we think this would probably be a reasonable approach.**

- **If by that time an SOV Enterprise Resource Planning (ERP) system exists or is under implementation, consider solutions that explicitly interface with that system, even if some delay is necessary (i.e., Wait)**
  At this time, our understanding is that an ERP system, though desirable for the State, is advanced enough to expect near-term implementation.

WHAT DO OTHER GOVERNMENTAL ENTITIES DO?

THE PROPERTY TAX ADMINISTRATION LANDSCAPE

Before assessing what alternatives are used by other governmental entities, it is important to understand that property tax assessment, equalization, billing, and use varies across the country. One simple differentiation is that assessment administration takes place in New England at the municipal level (towns, cities); but in most of the country, it takes place at the county level. Some counties have populations nearly as large as the entire state of Vermont. The experience and expertise of assessors and listers varies as well: densely populated urban areas are more likely to have professionally educated full-time personnel, whereas Vermont citizens performing these duties are more likely to be part-time, elected officials doing a valuable service for the community.

In a populous state where property tax management primarily occurs at the county level, but where the state is not involved with revenue collection, a state level data system is more likely to be concerned with equalization studies, less with granular data, and not at all with collection. In such a state, county-

level systems may be more concerned with assessment, listing, billing, and collection — reporting aggregate data for state-level use.

Vermont collects and equalizes data about property taxes at the State level because public education funding in Vermont relies on equalized property taxes and fairly distributing the resulting revenues. However, not every state relies on property taxes for education funding; and some that did, such as Minnesota, subsequently changed the funding mechanism to exclude property taxes. (In 2001, Minnesota state statute changed to provide for full state funding of the state-determined general education formula.[13])

In many populous counties the primary concern is about delinquency rates and the possible benefits of monthly billing. In these places, the IPTMS is seen as *largely* a billing mechanism (which is a feature, but not the only or primary feature, of the Vermont system). In other places, the main concern is *integration*, connecting the assessors, auditor, and revenue collection operations, often via an integrated ERP system. These all relate to but differ from the PVR priorities.

PREVALANCE OF ALTERNATIVE SOLUTIONS

A 2017 study by the Lincoln Institute of Land Policy,[14] "Investing in Collections Software to Allow for Monthly Property Tax Payments," surveys 398 government entities across the U.S. to determine the software solutions they are using. While collections software overlaps does not necessarily have exactly the same functions as IPTMS software, there is a great deal of overlap, especially at the larger scale that corresponds to Vermont's population size. The survey is insightful for several reasons. It finds for example, corresponding to the Vermont IPTMS experience, that "use of homegrown systems were more popular prior to the year 2000 and more recently, governments are turning to purchased systems available in the market."[15] ("Homegrown" systems correspond to our description of "built-from-scratch" systems, above.) At 57% share, property tax software vendor Tyler Technologies predominates among vendor-provided software in the large-sized (more than 500,000 population) county market.[16] And yet, in this same category, 43% of the counties still have "homegrown" systems.[17]

An example case in point is Cook County, Illinois. In 2015, Cook County selected Tyler Technologies to implement an ITPMS replacing a 40-year-old, 1970's mainframe-based system. With a population of 5.3

[13] https://www.revenue.state.mn.us/sites/default/files/2019-06/admin_manual_all%2006142019_0.pdf

[14] https://www.lincolninst.edu/sites/default/files/sources/events/reitano_wp17vr1.pdf

[15] *Ibid*., pg. 4

[16] *Ibid.*

[17] *Ibid.*

million, Cook County is significantly more populous than Vermont. The cost of the system (which also included a CAMA application, not provided in the present project) was $30 million.[18]

This supports our opinion, that although Vermont may be somewhat "behind the curve" of IPTMS modernization in the Northeast, it is far from outside the norm nationwide in modernization of similar, if not identical, property tax systems.

The table below shows the current statewide implementations by vendors who proposed solutions to the State. We include some installations that were acquired by state governments but cover a subset of each state's counties.

Table 12 - Statewide implementation by bidding vendors

State	Vendor
Indiana (certain counties)	Government Utilities Technology Service (GUTS)
Kansas	Tyler Technologies
Kentucky (certain counties)	GUTS
Maine	FAST Technologies (Maine has selected a vendor but has not finalized a contract)
New Hampshire	Axiomatic
New Mexico	Axiomatic
New York	Tyler Technologies
North Carolina	Farragut
Rhode Island	Vision
Tennessee	Tyler Technologies
West Virginia	Tyler Technologies
Wisconsin	Tyler Technologies

[18] https://www.businesswire.com/news/home/20151005005226/en/

We see that Tyler Technologies predominates in the statewide marketplace as in counties. However, we note that modernizations are anticipated in many jurisdictions in the near future and may well involve other vendors, so this should be considered a "snapshot" of this point in time.

ASSESSMENT OF STATE'S PROCUREMENT ALTERNATIVES

As we discuss elsewhere in this review, although the selected proposal was both the cost leader among the proposals as well as presenting a lower annual cost than the existing solution, our sense from reviewing documents and interviewing project scorers was that business functionality and usability were the primary drivers in the selection (as we think they should be). The selection process is described more fully in **Section 4.1 Historical Background**, *above*.

The selection of one vendor over the alternatives, therefore, was more a *positive* matter of choosing the best and most functional solution for the State, presented by an experienced vendor, rather than a *negative* assessment of feasibility. Some finalist proposals and demos were assessed by the team as being very viable. For example, some vendors scored more highly in some areas of Architectural Assessment than others, and yet on balance the selected vendor scored in the top tier. One vendor was judged as presenting some very exciting possibilities but was assessed as being too inexperienced at this point. Another was judged as being technically capable, being a current state vendor in other tax systems, but was inexperienced in IPTMS systems in particularly, and would effectively be doing "a new build."

The table below lists the Implementation Cost, Annual O&M Cost (average over lifecycle), and lifecycle total costs for each of the four finalist vendors. These are vendor costs only, and do not include State personnel devoted to implementation or operation. We refer to this table in the questions below.

Table 13 - Finalist Vendors' Pricing Comparison

Vendor	Implementation	Annual O&M	Lifecycle Total
Axiomatic (selected vendor)	**$ 914,701.00**	**$ 161,421.80**	**$ 1,480,961.00**
TYLER	$ 1,513,964.00	$ 254,438.00	$ 2,786,154.00
GUTS*	$ 216,315.00	$ 674,500.00	$ 4,824,624.00
NEMRC	$ 1,802,000.00	$ 652,000.00	$ 5,062,000.00
FAST	$ 5,075,000.00	$ 906,140.00	$ 9,605,700.00

**Government Utilities Technology Service*

In our opinion, the procurement team did a comprehensive job of collecting stakeholder and user input, assessing State needs, arranging vendor demonstrations and conducting site visits to other

states employing the various proposed vendors. They carefully weighed and assessed Strengths, Weaknesses, Opportunities, and Threats (SWOT Analysis) of the various proposals, and ultimately chose an appropriate solution for the State.

9.1 PROVIDE A BRIEF ANALYSIS OF ALTERNATE TECHNICAL SOLUTIONS THAT WERE DEEMED FINANCIALLY UNFEASIBLE.

- As can be seen from the table above, one proposal (FAST) was significantly more costly than the others over the lifecycle of the project. This would likely have been unfeasible as proposed, without a change in anticipated State funding of the system (currently from Fund 21594, a holdback from Property Transfer Tax kept for Current Use/PVR Computer systems improvements per statute)[19]. We note also that the cost as shown here does not include State-side costs for implementation, which might have been significant.

9.2 PROVIDE A BRIEF ANALYSIS OF ALTERNATE TECHNICAL SOLUTIONS THAT WERE DEEMED UNSUSTAINABLE.

- The State might have continued using the existing IPTMS solution. This approach would be **manifestly unsustainable**, as explained more fully in **Section 4.1 Historical Background**, *above*. To summarize, the existing system is built on an obsolete, unsupported software platform, requires the use of external, State-built applications (primarily Access databases), employs "manual" data transfers, and introduces process delays so significant that statutory requirements (for example, deadlines for data availability) may sometimes not be met.
- Similarly, the incumbent vendor proposed a system that eliminated the obsolete platform but might not have introduced sufficient new functionality. We also find that it required a moderate amount of customization, against the State's preference for configuration over customization.
- The State does not have internal resources to develop, maintain, or support a "homegrown" in-house solution, and there is an appropriate preference to avoid such solutions.

9.3 PROVIDE A BRIEF ANALYSIS OF ALTERNATE TECHNICAL SOLUTIONS WHERE THE COSTS FOR OPERATIONS AND MAINTENANCE WERE UNFEASIBLE.

- As in question 1. above, on an annual O&M basis, the FAST proposal may have been unfeasible without a change in funding.

[19] IT ABC, *pg.6*.

10. IMPACT ANALYSIS ON NET OPERATING COSTS

10.1 INSERT A TABLE TO ILLUSTRATE THE NET OPERATING COST IMPACT.

Table 14 - Net Operating Cost Impact

	Initial Implementation	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance	Total
	CY 2020*	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	
Project Cost	$ 1,373,885.00	$ 160,440.00	$ 160,440.00	$ 161,652.00	$ 161,652.00	$ 162,925.00	$ 2,180,994.00
Current Costs	$0	$ 233,801.00	$ 233,801.00	$ 233,801.00	$ 233,801.00	$ 233,801.00	$ (1,169,005.00)
Total Cost							$ 1,011,989.00

**Project implementation costs are all shown in this column. Hosting is not included.*

Table 15 - Cumulative Cost Comparison

	FY2021	FY2022	FY2023	FY2024	FY2025
Project Cost Cumulative	$ 1,534,325.00	$ 1,694,765.00	$ 1,856,417.00	$ 2,018,069.00	$ 2,180,994.00
Current Costs Cumulative	$ 233,801.00	$ 467,602.00	$ 701,403.00	$ 935,204.00	$ 1,169,005.00
Cumulative Cost Savings	$ (1,300,524.00)	$ (1,227,163.00)	$ (1,155,014.00)	$ (1,082,865.00)	$ (1,011,989.00)

10.2 PROVIDE A NARRATIVE SUMMARY OF THE ANALYSIS CONDUCTED AND INCLUDE A LIST OF ANY ASSUMPTIONS.

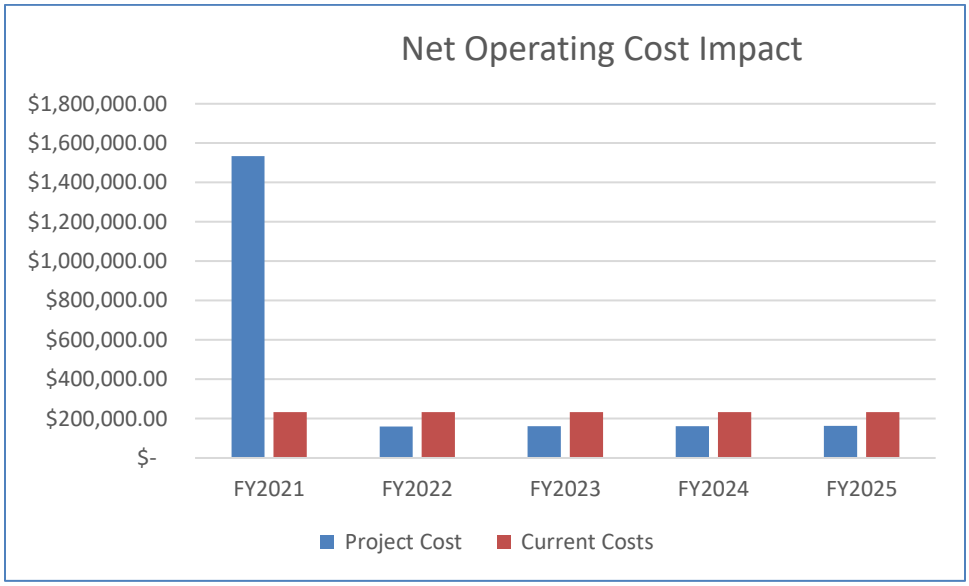


Figure 1 - Net Operating Cost Impact

The chart above shows the net operating cost impact of the proposed project compared with maintaining the current system at the current level of cost, derived from the figures in Table 10 on the previous page.

After initial implementation, the cost of operating and maintaining the new system will be approximately 69% of the cost of operating the current system, an annual savings of about $72,380, while providing significant new functionality.

The following assumptions apply:

- That the hosting and maintenance costs begin in alignment with the start of Fiscal Year 2021 (i.e., in July of 2020).
- That all the implementation costs accrue in CY2020 and FY2021. In actual fact, some implementation costs will likely accrue in FY 2022, a payment schedule is not yet in place. We think putting all the implementation costs in one column provides clarity.
- That the solution hosting cost is the vendor's proposed cost for hosting the solution in their datacenter. During the course of this review, the State has expressed a strong preference to have the vendor host the solution in a Microsoft Azure environment. At this time, a cost for Azure hosting is not included.

- That, for the purposes of this comparison, costs of the current solution would remain constant over the five years of the proposed contract period. This is only an approximation.

10.3 EXPLAIN ANY NET OPERATING INCREASES THAT WILL BE COVERED BY FEDERAL FUNDING. WILL THIS FUNDING COVER THE ENTIRE LIFECYCLE? IF NOT, PLEASE PROVIDE THE BREAKOUTS BY YEAR.

N/A

10.4 WHAT IS THE BREAK-EVEN POINT FOR THIS IT ACTIVITY (CONSIDERING IMPLEMENTATION AND ON-GOING OPERATING COSTS)?

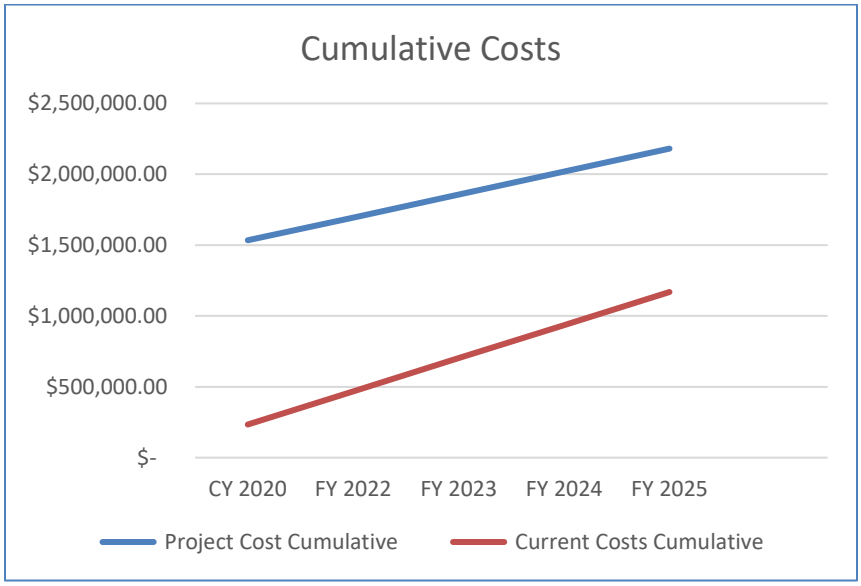


Figure 2 - Cumulative Costs

There is no expected break-even point during the initial contract period of the proposed project. The chart above, derived from Table 11 - Cumulative Cost Comparison, shows the trajectory of cumulative costs of the proposed project compared with cumulative current costs over the same period. The difference between the lines represents primarily the initial costs associated with implementation, even though the ongoing annual cost of the new project is lower. The trajectory shows that the lines would

continue to converge and eventually cross, indicating a positive return on investment. However, the unknowns of future costs of the proposed project, and the unlikelihood that maintaining the current solution is feasible at all in the long run make determining a future breakeven point too speculative to be useful.

If implementation costs are ignored, of course, the first chart is more useful, showing that the proposed project is less expensive on an annual basis from the start.

11. SECURITY ASSESSMENT

In general, the IPTMS contains largely public data, and not much protected data (i.e., data classified as statutorily protected, such as health data, personal financial data, etc.). However, it has been pointed out to us that it is at least conceivable that some data might be crossed referenced by a bad actor to determine someone's income, information that is considered private. At any rate, we would point out that the same controls that ensure privacy may also ensure security, in the sense that they protect the data from illegitimate alteration by an intruder. The State's standard security non-functional requirements are well-developed and rigorous. We think they should only be waived when there is a good reason.

The vendor has requested that SOV standard contract Attachment D (Information Technology System Implementation Terms and Conditions Section 6.4 Operations Security) requirement for SOC 2 Type 2 security audit be struck from contract, stating that vendor employs "standard security protocols and has all new applications security and penetration tested by a licensed third-party vendor." In some other projects or systems, State has determined adequacy of the vendor's protocols/reporting and waived this requirement. However, we do not see in the vendor's original proposal a detailed description of their protocols. We identify this as a risk. **RISK_ID# _R8_**

We recommend that the State Chief Information Security Officer or designated representative should evaluate vendor's request in light of proposed substitute protocols before State accedes to this request. Additionally, State should assess hosting options (i.e., vendor-hosted vs. cloud vs. on-premises) for best security/privacy option.

The State agrees with this recommendation.

- *Will the new system have its own information security controls, rely on the State's controls, or incorporate both?*

  Both. The solution has significant security controls including Single Sign On (SSO) and role based access rights. It is compatible with the State's security controls including Active Directory. **We think the information security controls are appropriate.**

- *What method does the system use for data classification?*

  The vendor will provide a data dictionary and other data definition documentation to meet the State's requirements. Classification of personal data is ultimately a State responsibility and a key component of the data governance process.

- *What is the vendor's breach notification and incident response process?*

Incidents are identified through one of several monitoring systems: operating system environment (OSE) monitoring, RDBMS monitoring, application monitoring, and external user reporting. When an incident has been detected or reported, the operations team determines if the trigger was a false positive and, if not, the appropriate course of action (e.g. quarantine or containment, recovery). The operations team then works to preserve forensic evidence and determines the scope of the compromise and the affected parties. These details are provided to the stakeholders along with a recommended course of action which may or may not include end-user notification, depending on the circumstances of the incident.

In the event of a security breach Axiomatic will notify client within 24 hours of its discovery. Axiomatic will report:

- Nature of breach
- Impacted data
- Mitigation plan/corrective action

In general, we think this response is adequate at this stage. The State may want more specifics about the mitigation plan and corrective action, particularly regarding tracking in a Plan of Action and Milestones (POA&M) and the State's continued access to that tracking.

- *Does the vendor have a risk management program that specifically addresses information security risks?*

Axiomatic uses ISO 3100:2018 risk management processes to identify, assess and mitigate risks where possible and to continually monitor risks throughout the remainder of the project. An initial risk workshop is held with the appropriate stakeholders at the beginning of the project to identify and analyze risks. Each risk is given a likelihood and impact score of high, medium or low. Risk rankings are used to determine which risks are substantial enough to warrant mitigation planning. All risks are memorialized in a risk register. For risks that have a medium-medium score or higher, mitigation plans with detailed actions items are developed. Mitigation action items are tracked in the global action item register to ensure consistency.

In general, we think this is an adequate approach, and consistent with State processes. An exception is that the State will generally want mitigation plans for all identified risks, not just medium/medium.

- *What encryption controls/technologies does the system use to protect data at rest and in transit?*

Data will be protected in-transit by securing all client-server communications between the client's browser and the web server via HTTPS. HTTPS will be enforced; no unsecured

connections are permitted. The system will use TLS 1.2+ with SHA- 256 encryption. The SSL certificates will be issued and signed by a trusted third-party certification authority (e.g. Comodo Group, DigiCert, GeoTrust).

At-rest structured data encryption provided by SQL Server TDE. At-rest bulk data (filesystem) encryption provided by Bitlocker.

Transparent Data Encryption (TDE) will be enabled on all databases, providing both at-rest and real-time I/O encryption/decryption of system data. This protection extends to all logs, files, and filegroups used by the database. The database instances are should not publicly-accessible from outside network. At the time of SQL Server provisioning, an instance-specific Service Master Key should be created. This key is unique to the SQL Server instance and is encrypted at the OSE level by the data protection API. Each database created on the instance has its own set of encrypted keys and certificates.

This is adequate.

- *What format does the vendor use for continuous vulnerability management, what process is used for remediation, and how do they report vulnerabilities to customers?*

  Service Provider will conduct monthly vulnerability scanning of the systems storing/processing/ transmitting State of Vermont information and provide reports of those scans within 10 business days, including the severity of the vulnerabilities and remediation plans. Security and penetration testing are conducted on the production environment and network. Axiomatic will retain a third-party security testing firm to conduct security and penetration testing on the production environment to verify compliance with applicable standards (NIST 800-171, and NIST SP800-53 Moderate Risk Controls). Any identified security risks will be remedied and re-tested and a final certification will be provided to PVR that the application and environment have successfully passed security and penetration testing.

  This is not strictly speaking continuous. However, it is probably consistent with State expectations for these classifications of data. The third-party security testing firm should be agreed with State.

- *How does the vendor determine their compliance model and how is their compliance assessed?*

  As stated above, this solution will not in general hold protected information. Therefore, security compliance models such as Health Insurance Portability and Accountability Act (HIPPA) or Payment Card Industry – Security Standards (PCI). **We believe compliance with the State's standard security NFRs or controls of equivalent efficacy are appropriate for this solution.**

12. RISK ASSESSMENT & RISK REGISTER

Table 16 - Risk Register Components

Risk ID:	Identification number assigned to risk or issue.	
Risk Rating:	An assessment of risk significance, based on multiplication of **(probability X impact ratings)** (*see below*).	
	1-9 = low	See table below
	10-48 = moderate	
	49-90 high	
Probability:	Assessment of likelihood of risk occurring, scale of **1,3,5,7, or 9**, from least to most likely	
Impact:	Assessment of severity of negative effect, scale of **1,3,5,7, or 10**, from least to most severe	
Finding:	Review finding which led to identifying a risk	
Risk Of:	Nature of the risk	
Risk domains:	What may be impacted, should the risk occur	
Reviewer's recommendation	Decision to *avoid*, *mitigate*, or *accept* risk Detailed description of response to risk, in order to accomplish decision	
State's response	State's planned action in light of recommendation	
Reviewer's Assessment:	Reviewer's evaluation of the State's planned response	

Table 17 - Risk Rating Matrix

Risk Rating Matrix			IMPACT				
			Trivial	Minor	Moderate	Major	Extreme
			1	3	5	7	10
LIKELIHOOD	Rare	1	1	3	5	7	10
	Unlikely	3	3	9	15	21	30
	Moderate	5	5	15	25	35	50
	Likely	7	7	21	35	49	70
	Very Likely	9	9	27	45	63	90

ADDITIONAL COMMENTS ON RISK

None

Risk ID: R1	Rating: Likelihood: Impact:	**21** **3** **7**
Finding:	Certain key project knowledge is held by one Subject Matter Expert (ADS IT Support for Grand List Solution) and this knowledge is not necessarily accessible in documentation. Unavailability of this resource for any reason could result in delay if the knowledge must be reconstructed from other sources.	
Risk Of:	Project delay	
Risk Domains:	Timeline	
Reviewer's recommendation	Provide redundancy through knowledge transfer, e.g., by devoting some personnel resource to "shadow" this SME	
State's response	Mitigate: Agree to an extent. A new resource will be shadowing the current resource on the new build, but they do not have the bandwidth to knowledge transfer everything that goes on in the current system.	

	Rating:	**9**
Risk ID: R2	Likelihood:	**3**
	Impact:	**3**
Finding:	As detailed understanding of business processes have evolved, there a possibility of some expansion of scope (e.g., perhaps in integration with Agency of Education data).This could well be to the benefit of the State, but there is currently no formal project/scope change management mechanism in the project.	
Risk Of:	Project delay	
Risk Domains:	Timeline, Cost	
Reviewer's recommendation	Ensure creation of project/scope change management process within project team, with links to Executive Sponsorship, vendor, and any appropriate stakeholder(s)	
State's response	Mitigate: Agree. The project scope will be baselined by attachment A and the exhibit with project requirements. The contract will outline a change management process and a change management plan that describes the detail of that process will be developed by the Project Manager.	

Risk ID: R3	Rating: Likelihood: Impact:	**3** **1** **3**
Finding:	It is widely anticipated within the project and among stakeholders (e.g., in municipalities) that procedures to accomplish common tasks will change significantly in the transition to the new system. There is no dedicated Organizational Change Manager associated with the project. There is, however, a dedicated communication resource, which somewhat addresses this.	
Risk Of:	Implementation delay, parallel systems, increased training costs, temporary reversion to manual methods	
Risk Domains:	Timeline, Training Costs, project reputation	
Reviewer's recommendation	Ensure availability of appropriate Organizational Change Management resources and continue to develop an explicit OCM plan. If the communication resource is to be the OCM point person, ensure that s/he has sufficient access to those resources.	
State's response	Mitigate: The Tax department has a dedicated resource specifically for this project, that will be working directly with municipalities and communications around this project. The Tax department will also leverage their POLA (Policy Outreach and Legislative Affairs) unit to help with communication to the towns as they have established relationships and communication channels with them already.	

Risk ID: R4	Rating: Likelihood: Impact:	**15** **3** **5**
Finding:	Implementation training and ongoing support is expected to involve State personnel, especially District Advisors. Much of this activity may be on-site in the municipalities, with a potential burden not only on human resources, but also on time, in the form of travel.	
Risk Of:	Inadequate personnel and/or time resources, implementation delay, temporary reversion to deprecated manual methods.	
Risk Domains:	Timeline, Training Costs	
Reviewer's recommendation	Anticipate and explicitly plan for the deployment of State resources for training/support. In particular, track and quantify the need for such resources during the "beta test" phase, when a voluntary selection of towns will test the systems (expected early 2021). Develop training protocols, triage if necessary, and lean heavily on available vendor resources. If appropriate, identify temporary "fallback" procedures (e.g., some manual methods are allowed for some period of time.)	
State's response	Mitigate: Agree	

Risk ID: R5	Rating: Likelihood: Impact:	**9** **3** **3**
Finding:	Technology, broadband access, technical expertise might be limited in some municipalities, potentially limiting or otherwise affecting efficient use of the new system.	
Risk Of:	Implementation delay, temporary reversion to deprecated manual methods	
Risk Domains:	Project Success, State reputation	
Reviewer's recommendation	Assess municipalities' capabilities during the development year (2020); develop resulting plan to remediate in advance of go-live	
State's response	Mitigate: Agree. Some of this information has already been collected through a survey that was done with Vermont Leagues of City and Towns and the State plans on continuing this work to come up with a plan to best support those towns that may be lacking from a technology standpoint.	

Risk ID: R6	Rating: Likelihood: Impact:	**15** **3** **5**
Finding:	Extent of cooperation by outgoing vendor is unknown. Such cooperation would be helpful especially for conversion of legacy data in the existing system. The proposed vendor does have successful cooperation experience with the outgoing vendor, and the outgoing vendor will have continued business with municipalities for other software (out of scope of this project).	
Risk Of:	Project or development delay if data conversion is not complete	
Risk Domains:	Timeline	
Reviewer's recommendation	Assess level of cooperation early in development year (2020). Front-load data conversion in development process.	
State's response	Avoid: The State is aware of this and is working on collecting 2019 Grand list data with towns and current vendor and will have a complete backup by the end of February 2020. Once that data is finalized, this becomes a non-risk.	

Risk ID: R7	Rating: Likelihood: Impact:	**10** **1** **10**
Finding:	Vendor, while experienced, is a relatively small technology company. Much of the new system code will be configured specifically for Vermont, and some development of code may be Vermont specific. If for any reason vendor ceased business, Vermont could lose access to code necessary for future configuration (e.g., in light of statutory changes). Proposed vendor has offered software escrow. It is unclear at this point if this would be at additional cost.	
Risk Of:	Inability to adapt system to future needs if State cannot update system to meet new requirements	
Risk Domains:	Future system utility	
Reviewer's recommendation	Accept software escrow option.	
State's response	Mitigate: Agree	

Risk ID: R8	Rating: Likelihood: Impact:	**21** **3** **7**
Finding:	Vendor has requested that SOV standard contract Attachment D (Information Technology System Implementation Terms and Conditions Section 6.4 Operations Security) requirement for SOC 2 Type 2 security audit be struck from contract, stating that vendor employs "standard security protocols and has all new applications security and penetration tested by a licensed third-party vendor." In some other projects or systems, State has determined adequacy of the vendor's protocols/reporting and waived this requirement. However, we do not see in the vendor's original proposal a detailed description of their protocols. We acknowledge that the State's security analyst for this project has determined that there is minimal protected information contained in the system's data.	
Risk Of:	Inadequate security/privacy,	
Risk Domains:	Enterprise Architecture, Security, Privacy, SOV reputation	
Reviewer's recommendation	Mitigate: SOV CISO should evaluate vendor's request in light of proposed substitute protocols before State accedes to request. Additionally, State should assess hosting options (i.e., vendor-hosted vs. cloud vs. on-premises) for best security/privacy option.	
State's response	Agree	

Risk ID: R9	Rating: Likelihood: Impact:	**9** **1** **5**
Finding:	The vendor's proposal does not contain sufficient information to determine if the State's relevant Non-functional Requirements (NFRs) are met. We are not of the opinion that the vendor cannot or will not meet these requirements, only that they have not been adequately addressed. [NOTE: The mitigation for this general risk, an ADS Enterprise Architecture conducted Architectural Assessment, is now underway}	
Risk Of:	Non-compliance with State NFR requirements	
Risk Domains:	Enterprise Architecture	
Reviewer's recommendation	Perform Architecture Assessment via ADS. EA report should identify mitigations or recommendations for any ambiguities or shortcomings. Memorialize requirements in contract where appropriate.	
State's response	Mitigate: This risk will be mitigated through NFRs in the contract and the SLA.	

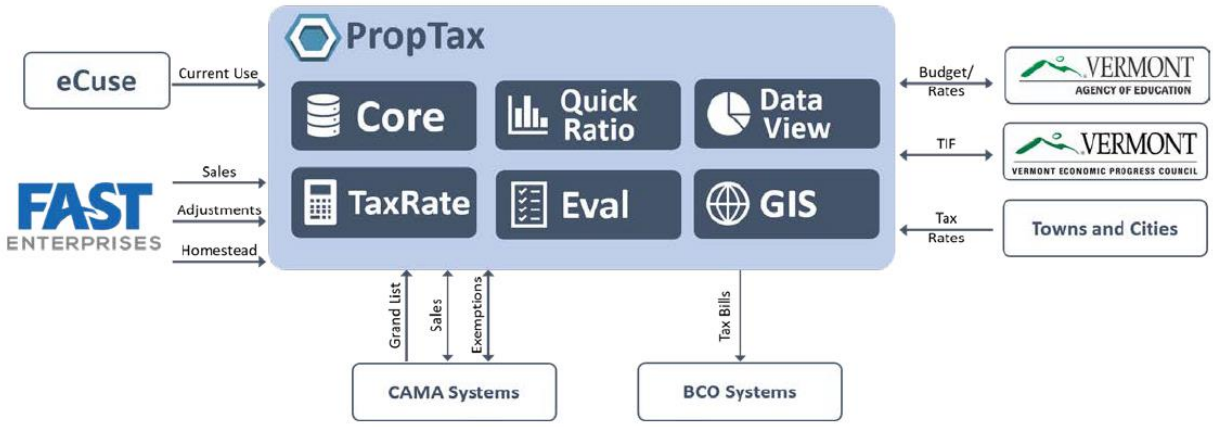
13. ATTACHMENTS

Attachment 1 – Illustration of System Integration

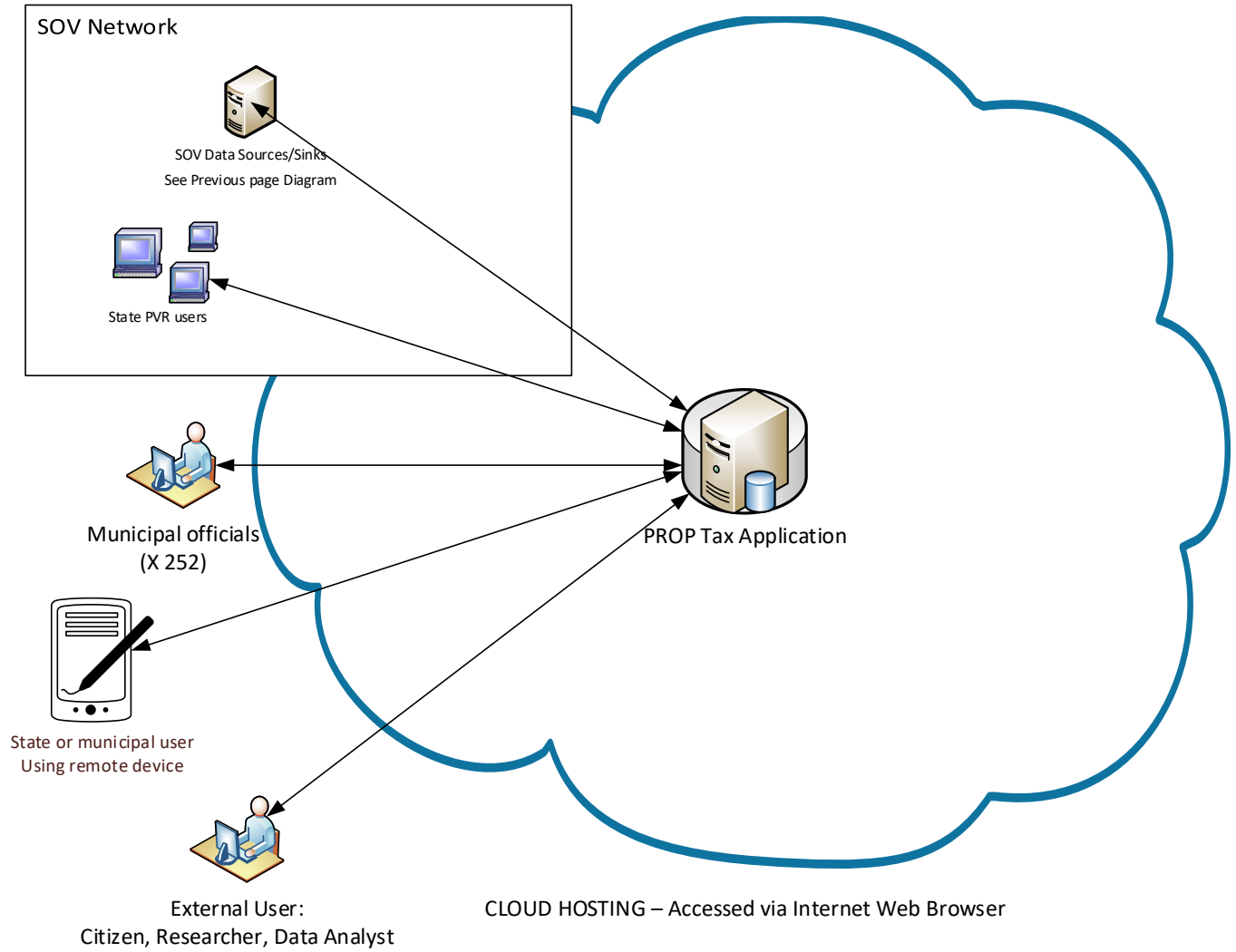
Attachment 2 – Risk Register

Attachment 3 – Cost Spreadsheet

ATTACHMENT #1 – ILLUSTRATION OF SYSTEM INTEGRATION – PART 1: STATE DATA CONNECTIONS



ATTACHMENT #1 – ILLUSTRATION OF SYSTEM INTEGRATION – PART 2 – USER ACCESS



ATTACHMENT 2 - INTEGRATED PROPERTY TAX MANAGEMENT SYSTEM INDEPENDENT REVIEW -- Risk and Issues Register -- version 2.0.a 2020/January/15 -- Paul E. Garstki, JD -- Paul Garstki

Consulting

RISKS

What is the finding that leads to identifying a risk? (This is a highly condensed version that is explained more fully in the report narrative)

What are the risks implied by the finding?

What aspects of the project are at risk if the risk(s) are realized?

What is the Independent Reviewer recommending?

What is the State's response to the recommendation(s) (e.g., agree, or alternative risk response.)

Reviewer's assessment of likelihood risk is realized 1,3,5,7, or 10

Reviewer's assessment of impact if risk is realized 1,3,5,7, or10

1-9 low
10-48 medium
49-100 high

Note: Risk ID # list may have gaps, in order to maintain consistency with earlier drafts

Risk #	Finding	risk of	risk domains	Reviewer Recommendation	SOV response	likelihood 1-10	impact 1-10	total rating
R1	Certain key project knowledge is held by one Subject Matter Expert (ADS IT Support for Grand List Solution) and this knowledge is not necessarily accessible in documentation. Unavailability of this resource for any reason could result in delay if the knowledge must be reconstructed from other sources.	Project delay	Timeline	Provide redundancy through knowledge transfer, e.g., by devoting some personnel resource to "shadow" this SME	**Mitigate:** Agree to an extent. A new resource will be shadowing the current resource on the new build, but they do not have the bandwidth to knowledge transfer everything that goes on in the current system.	**3**	**7**	**21**
R2	As detailed understanding of business processes have evolved, there a possibility of some expansion of scope (e.g., perhaps in integration with Agency of Education data).This could well be to the benefit of the State, but there is currently no formal project/scope change management mechanism in the project.	Project delay	Timeline, Cost	Ensure creation of project/scope change management process within project team, with links to Executive Sponsorship, vendor, and any appropriate stakeholder(s)	**Mitigate:** Agree. The project scope will be baselined by attachement A and the exhibt with project requirements. The contract will outline a change management process and a change management plan that describes the detail of that process will be developed by the Project Manager.	**3**	**3**	**9**
R3	It is widely anticipated within the project and among stakeholders (e.g., in municipalities) that procedures to accomplish common tasks will change significantly in the transition to the new system. There is no dedicated Organizational Change Manager associated with the project. There is, however, a dedicated communication resource, which somewhat addresses this.	Implementation delay, parallel systems, increased training costs, temporary reversion to manual methods	Timeline, Training Costs, project reputation	Ensure availability of appropriate Organizational Change Management resources and continue to develop an explicit OCM plan. If the communication resource is to be the OCM point person, ensure that s/he has sufficient access to those resources.	**Mitigate:** The Tax department has a dedicated resource specifcally for this project, that will be working directly with manicipalities and communications around this project. The tax department will also leverage their POLA (Policy Outreach and Legislative Affairs) unit to help with communication to the towns as they have established relationships and communication channels with them already.	**1**	**3**	**3**
R4	Implementation training and ongoing support is expected to involve State personnel, especially District Advisors. Much of this activity may be on-site in the municipalities, with a potential burden not only on human resources, but also on time, in the form of travel.	Inadequate personnel and/or time resources, implementation delay, temporary reversion to deprecated manual methods.	Timeline, Training Costs	Anticipate and explicitly plan for the deployment of State resources for training/support. In particular, track and quantify the need for such resources during the "beta test" phase, when a voluntary selection of towns will test the systems (expected early 2021). Develop training protocols, triage if necessary, and lean heavily on available vendor resources. If appropriate, identify temporary "fallback" procedures (e.g., some manual methods are allowed for some period of time.)	**Mitigate:** Agree	**3**	**5**	**15**
R5	Technology, broadband access, technical expertise might be limited in some municipalities, potentially limiting or otherwise affecting efficient use of the new system.	Implementation delay, temporary reversion to deprecated manual methods	Project Success, State reputation	Assess municipalities' capabilities during the development year (2020); develop resulting plan to remediate in advance of go-live	**Mitigate:** Agree. Some of this information has already been collected through a survey that was done with Vermont Leagues of City and Towns and the State plans on continuing this work to come up with a plan to best support those towns that may be lacking from a technology standpoint.	**3**	**3**	**9**
R6	Extent of cooperation by outgoing vendor is unknown. Such cooperation would be helpful especially for conversion of legacy data in the existing system. The proposed vendor does have successful cooperation experience with the outgoing vendor, and the outgoing vendor will have continued business with municipalities for other software (out of scope of this project).	project or development delay if data conversion is not complete	Timeline	Assess level of cooperation early in development year (2020). Front-load data conversion in development process.	**Avoid:** The State is aware of this and is working on collecting 2019 Grandlist data with towns and current vendor and will have a complete backup by the end of Feburary 2020. Once that data is finalized, this becomes a non-risk.	**3**	**5**	**15**

Risk #	Finding	risk of	risk domains	Reviewer Recommendation	SOV response	likelihood 1-10	impact 1-10	total rating
R7	Vendor, while experienced, is a relatively small technology company. Much of the new system code will be configured specifically for Vermont, and some development of code may be Vermont specific. If for any reason vendor ceased business, Vermont could lose access to code necessary for future configuration (e.g., in light of statutory changes). Proposed vendor has offered software escrow. It is unclear at this point if this would be at additional cost.	Inability to adapt system to future needs if State cannot update system to meet new requirements	Future system utility	Accept software escrow option.	**Mitigate:** Agree	**1**	**10**	**10**
R8	Vendor has requested that SOV standard contract Attachment D (Information Technology System Implementation Terms and Conditions Section 6.4 Operations Security) requirement for SOC 2 Type 2 security audit be struck from contract, stating that vendor employs "standard security protocols and has all new applications security and penetration tested by a licensed third-party vendor." In some other projects or systems, State has determined adequacy of the vendor's protocols/reporting and waived this requirement. However, we do not see in the vendor's original proposal a detailed description of their protocols. We acknowledge that the State's security analyst for this project has determined that there is minimal protected information contained in the system's data.	Inadequate security/privacy,	Enterprise Architecture, Security, Privacy, SOV reputation	SOV CISO should evaluate vendor's request in light of proposed substitute protocols before State acceeds to request. Additionally, State should assess hosting options (i.e., vendor-hosted vs. cloud vs. on-premises) for best security/privacy option.	**Mitigate:** Agree	**3**	**7**	**21**
R9	The vendor's proposal does not contain sufficient information to determine if the State's relevant Non-functional Requirements (NFRs) are met. We are not of the opinion that the vendor cannot or will not meet these requirements, only that they have not been adequately addressed. [NOTE: The mitigation for this general risk, an ADS Enterprise Architecture conducted Architectural Assessment, is now underway}	Non-compliance with State NFR requirements	Enterprise Architecture	Perform Architecture Assessment via ADS. EA report should identify mitigations or recommendations for any ambiguities or shortcomings. Memorialize requirements in contract where appropriate.	**Mitigate:** This risk will be mitigated through NFRs in the contract and the SLA.	**1**	**5**	**5**
						0	**0**	**0**
						0	**0**	**0**

ISSUES none at this time

NOTES:

Attachment 3: IPTMS Cost Spreadsheet ver. 2.0a

Project Name:			Integrated Property Tax Management Solution							implementation - vendor only	checksum
Description	Qty	Unit Price	Initial Implementation[3]	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance	Total		
Fiscal Year			CY 2020-21	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025			
Hardware											
Server Hardware			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Network Upgrades			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Desktop Hardware			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Other			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Hardware Total			**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	$ -
Software											
Enterprise App. License Fees			$ 219,250.00	$ -	$ -	$ -	$ -	$ -	$ 219,250.00		
ARCGis 4-core license[1]			$ 20,000.00						$ 20,000.00		
Continuing existing system			$ 233,801.00						$ 233,801.00		
Maintenance &or License Fee Add-ons			$ 20,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 45,000.00		
Subscription cost			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Hosting[2]			$ -	$ 30,040.00	$ 30,040.00	$ 31,252.00	$ 31,252.00	$ 32,525.00	$ 155,109.00		
Storage Limitations and/or Additional Fees			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Database Software: License Fees			$ 20,000.00	$ -	$ -	$ -	$ -	$ -	$ 20,000.00		
Middleware Tools: License Fees			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Operating System Software: License Fees			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Upgrade Costs for Later Years			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Support and Maintenance Fees			$ -	$ 125,400.00	$ 125,400.00	$ 125,400.00	$ 125,400.00	$ 125,400.00	$ 627,000.00		
NEMRC Legacy Support & Maintenance (overlap)			$ 148,801.00	$ -	$ -	$ -	$ -	$ -	$ 148,801.00		
NEMRC Provision for software updates & Legislative changes			$ 12,000.00	$ -	$ -	$ -	$ -	$ -	$ 12,000.00		
Software Escrow			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Software Total			**$ 673,852.00**	**$ 160,440.00**	**$ 160,440.00**	**$ 161,652.00**	**$ 161,652.00**	**$ 162,925.00**	**$ 1,480,961.00**	**$ 493,051.00**	$ 1,480,961.00
Consulting											
Third-Party - Technical			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Third-Party - Business			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Deployment			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Upgrade			$ -	$ -	$ -	$ -	$ -	$ -			
Independent Review			$ 17,769.00	$ -	$ -	$ -	$ -	$ -	$ 17,769.00		
Consulting Total			**$ 17,769.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 17,769.00**	**$ -**	$ 17,769.00
Training											
NEMRC Training for State & Towns for Grand List & MicroSolve use			$ 70,000.00						$ 70,000.00		
Training Total (vendor provided)			$ 41,800.00	$ -	$ -	$ -	$ -	$ -	$ 41,800.00		
Other			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Training Total			**$ 111,800.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 111,800.00**	**$ 41,800.00**	$ 111,800.00
Implementation Services											
Project Management			$ 52,800.00	$ -	$ -	$ -	$ -	$ -	$ 52,800.00		
Requirements			$ 24,750.00	$ -	$ -	$ -	$ -	$ -	$ 24,750.00		
Design (Architect Solution)			$ 13,750.00	$ -	$ -	$ -	$ -	$ -	$ 13,750.00		
Development (Build, Configure or Aggregate Testing			$ 198,350.00	$ -	$ -	$ -	$ -	$ -	$ 198,350.00		
System Testing			$ 55,550.00	$ -	$ -	$ -	$ -	$ -	$ 55,550.00		
Defect Removal			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Implement/Deploy or Integrate			$ 34,650.00	$ -	$ -	$ -	$ -	$ -	$ 34,650.00		
Implementation Services Total			**$ 379,850.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 379,850.00**	**$ 379,850.00**	$ 379,850.00
Personnel - Additional											
State Personnel											
ADS Security & Tax IT inception to Oct 2019			$ 24,813.00						$ 24,813.00		
Tax Business Leads inception to Oct 2019			$ 17,125.00						$ 17,125.00		
ADS PM & EA Services inception to Oct 2019			$ 148,676.00						$ 148,676.00		
			$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Personnel - Additional Total			**$ 190,614.00**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 190,614.00**	**$ -**	$ 190,614.00
Grand Total			**$ 1,373,885.00**	**$ 160,440.00**	**$ 160,440.00**	**$ 161,652.00**	**$ 161,652.00**	**$ 162,925.00**	**$ 2,180,994.00**	**$ 914,701.00**	
vendor implementation costs only:			$ 914,701.00								
NOTES / ASSUMPTIONS:										checksum:	$ 2,180,994.00

Notes:
1. ESRI
2. Hosting at vendor's datacenter; listed here as a software cost
3. Includes internal State project development costs (ADS) incurred in 2018-19