OFFICE OF ENTERPRISE TECHNOLOGY SERVICES

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March 12, 2020

The Honorable Ronald D. Kouchi,
  President, and
   Members of The Senate
Twenty-Ninth State Legislature
Hawaii State Capitol, Room 409
Honolulu, Hawaii 96813

The Honorable Scott K. Saiki,
  Speaker, and
   Members of The House of Representatives
Twenty-Ninth State Legislature
Hawaii State Capitol, Room 431
Honolulu, Hawaii 96813

Dear President Kouchi, Speaker Saiki, and Members of the Legislature:

Pursuant to HRS section 27-43.6, which requires the Chief Information Officer to submit applicable independent verification and validation (IV&V) reports to the Legislature within ten days of receiving the report, please find attached the report the Office of Enterprise Technology Services received for the State of Hawaii Department of Health Hawaii BHA Integrated Case Management System Project.

In accordance with HRS section 93-16, this report may be viewed electronically at http://ets.hawaii.gov (see "Reports").

Sincerely,

Douglas Murdock (Mar 12, 2020)

DOUGLAS MURDOCK
Chief Information Officer
State of Hawai'i

Attachment (2)

Hawaii BHA Integrated Case Management System Project – *Phase 3*

Final IV&V Report for the period of

November 18, 2019 - December 31, 2019

Final submitted: January 15, 2020

PUBLIC CONSULTING GROUP

Solutions that Matter

Agenda

Executive Summary

IV&V Findings & Recommendations

Appendices

- **A – Rating Scales**
- **B – Inputs**
- **C – Project Trends**

Executive Summary

IV&V began work on its Phase 3 contract extension in the middle of November 2019, aligning our services with the BHA-ITS project timeline and agile software development approach. During this reporting period, IV&V initiated an evaluation of the project's progress towards achieving the objectives of Phase 3, as well as BHA's progress towards assuming the responsibility for maintaining and operating the solution at the end of this phase.

In general, the project is progressing well and addressing challenges as they arise. IV&V has some concerns regarding the bandwidth of key BHA resources and processes employed for critical project activities such as prioritizing enhancements and validating user stories and test cases, especially as they pertain to regression testing. BHA began the process of assuming ownership of Calculator 3.0, (built using an open source JavaScript framework) via RSM-led knowledge transfer sessions. IV&V will follow up on this in January to better understand BHA's approach to supporting the Calculator 3.0 feature using this open source framework on a long-term basis

The strong working relationship between BHA and RSM continues from previous phases, and the project continues to hit meet production expectations. BHA and RSM continue to hold on-the-job training/knowledge transfer sessions with the goal of ensuring key BHA project resources are up to speed on project development and configuration processes and procedures.

| -	-	Dec	Category	IV&V Observations
		G	**Sprint Planning**	Release 3.4 (R3.4) Sprint Planning was challenged by planned time off (PTO) and the holidays, as well as an imbalance in the number of development and configurator resources, which resulted in the need to adjust development and configuration resources for both R3.4 and R3.5. IV&V opened a preliminary concern that will focus on investigating the status of key project activities, processes, and artifacts specific to Sprint Planning including a detailed roadmap, an approved "definition of done", and the project's usage of TFS.
		G	**User Story (US) Validation**	During Release 3.3, the project team discovered that certain US' that were scoped to require configuration only, required unplanned custom code development. These US' were tagged for configuration resources to implement, but ultimately required developer resources for completion. Due to the late discovery of the need for custom coding, the development resources were unavailable. As a result, some US' have been deferred to a future release.

Executive Summary

-	-	Dec	Category	IV&V Observations
		G	**Test Practice Validation**	After Release 3.3 (R3.3) was released into production, a defect was identified that deprecated existing functionality. Although the new code developed in R3.3 was tested, the defect was missed during regression testing. The project is working to implement process controls to avoid defects like this in the future. IV&V has opened this as a preliminary concern for follow up in the January 2020 reporting period.
		G	**Release / Deployment Planning**	There are no open findings in this category for this reporting period. IV&V will observe Release and Deployment Planning activities in January 2020.
		G	**OJT and KT Sessions**	There are no open findings in this category for this reporting period. It is IV&V's understanding that on-the-job training (OJT) sessions between BHA and RSM architects will continue in January. IV&V will observe these sessions as appropriate.
		G	**Targeted KT**	RSM and BHA began conducting Calculator 3.0 targeted KT sessions in December that will continue through January. As Calculator 3.0 was built in Vue.JS (open source JavaScript), IV&V is investigating the project's plans for using community support resources going forward to ensure appropriate support is available to BHA.
		G	**Project Performance Metrics**	There are no open findings in this category for this reporting period. IV&V will continue to work with BHA to refine the key Project Performance Metrics that are critical to the project and provide an update in the January 2020 report.
		G	**Organizational Maturity Metrics**	There are no open findings in this category for this reporting period. IV&V will work with BHA to refine the Organizational Maturity Metrics most critical to be tracked and will provide its first update on the status of BHA's organizational maturity in the January 2020 report..

Executive Summary

As of the December 2019 reporting period, IV&V has three open preliminary concerns, one each in the Sprint Planning, Test Practice Validation, and Targeted Knowledge Transfer assessment areas.

IV&V Preliminary Concerns by Assessment Area
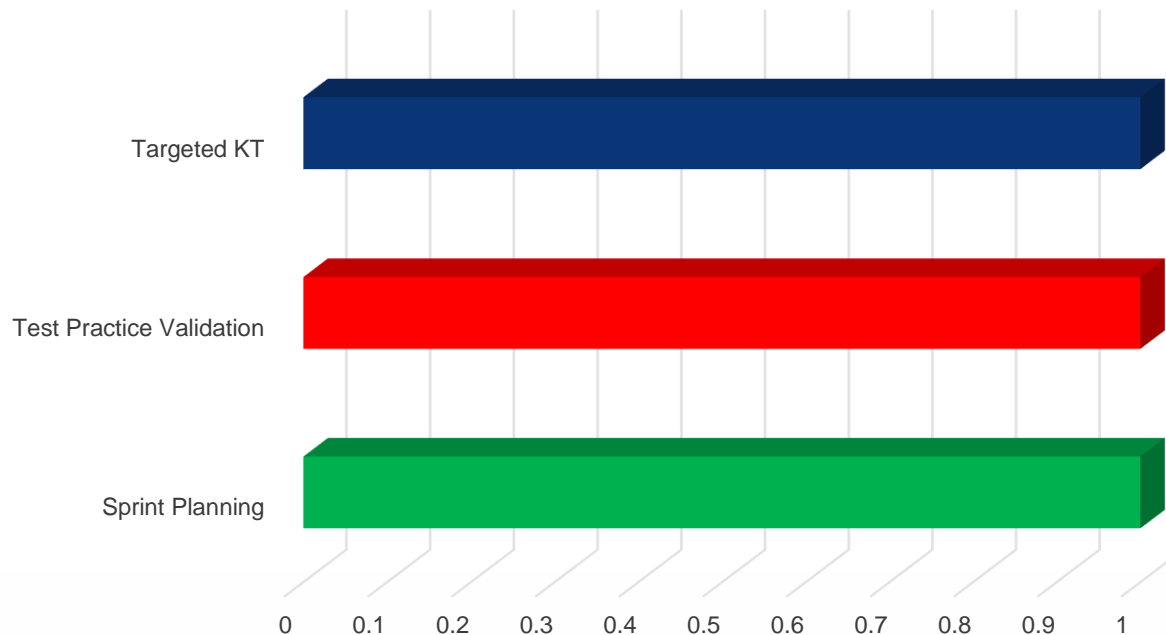
IV&V Findings & Recommendations

IV&V Findings & Recommendations
Assessment Categories

Throughout this project, IV&V will verify and validate activities performed in the following process areas:

- Sprint Planning

- User Story Validation

- Test Practice Validation

- Release / Deployment Planning

- On-the-Job Training (OJT) and Knowledge Transfer (KT) Sessions

- Targeted Knowledge Transfer (KT)

- Project Performance Metrics

- Organizational Maturity Metrics

IV&V Findings & Recommendations
Sprint Planning

#	Key Findings	Criticality Rating
1	**New Preliminary Concern** – IV&V is currently investigating the following topics as they relate to Sprint Planning and the project's overall approach to agile software development: • IV&V acknowledges that the project is now planning three sprints outs, however, it appears that only a "high-level" sprint planning roadmap has been produced, and it is unclear exactly how the project is targeting features for each release through the end of Mod 4. • IV&V is not aware of how the project is currently defining "done" for Mod 3 and Mod 4 Additionally, in the January 2020 reporting period, IV&V will seek additional information and visibility into the project's processes specific to prioritizing requests and how user stories in TFS are tagged to features, as well as the realignment of project development and configuration resources to complete the scope of Release 3.5.	N/A

Recommendations	Status
• As much as possible, the project should identify what feature enhancements will be targeted for each Release and should clearly map out the roadmap out through the last Phase 3 release in September 2020.	New
• The project should clearly define "Done" to ensure the project team is working towards the same goal and increase opportunities for success. Having a clear "definition of done" will help provide the project with guidance on how to stay within scope.	New

IV&V Findings & Recommendations
User Story Validation

#	Key Findings	Criticality Rating
	There are no open findings in this category for this reporting period. IV&V will work with BHA to perform deeper analysis on the project's processes for writing, validating, and planning US development through release and into M&O.	

IV&V Findings & Recommendations
Test Practice Validation

#	Key Findings	Criticality Rating
2	**New Preliminary Concern** – R3.3 introduced a defect that deprecated features in production specific to Integrated Support and Life Trajectory functionality. DDD has informed IV&V that there are other examples of functionality being deprecated after a release, some of which are still being investigated. As of this report, IV&V has not evaluated the project's root cause analysis (RCA) process used to determine why such functionality was deprecated but will discuss further with BHA in January 2020. IV&V will investigate and discuss the project's processes specific to regression testing with BHA and RSM in the January 2020 reporting period.	N/A

Recommendations	Status
• IV&V suggests that business users thoroughly validate all test cases associated with each user story and flag those needing regression testing.	New
• To the extent possible, BHA should explore test automation to support regression test efforts.	New

IV&V Findings & Recommendations
Release / Deployment Planning

#	Key Findings	Criticality Rating
	As of the December reporting period, there are no open findings in this category. IV&V will continue to review and observe the project's Release and Deployment Planning activities and efforts in the January 2020 reporting period. Additionally, IV&V will investigate related concerns and process areas to determine their impact on Release and Deployment activities.	

IV&V Findings & Recommendations

On-the-Job Training (OJT) and Knowledge Transfer (KT) Sessions

#	Key Findings	Criticality Rating
	As of the December reporting period, there are no findings in this category. IV&V will continue to work with BHA to identify OJT and KT needs and will attend any planned sessions that are appropriate for IV&V to observe.	

IV&V Findings & Recommendations
Targeted KT

#	Key Findings	Criticality Rating
3	**New Preliminary Concern** – IV&V learned in December 2019 that the Calculator 3.0 functionality is built in Vue.JS, an open source JavaScript framework. As this framework is relatively new, the open source support community is small. IV&V's concerns include: • The availability of reliable support for Vue.JS • The project's understanding of any known vulnerabilities with Vue.JS, and development of a process to remain current on vulnerabilities discovered by the support community. • The RSM lead for Calculator 3.0 went on extended parental leave in December 2019 IV&V acknowledges that BHA has downloaded Vue.JS to start getting familiar with it, and that BHA and RSM will continue to hold knowledge transfer sessions in January 2020.	N/A

Recommendations	Status
• IV&V recommends BHA research and determine the long-term sustainability of Vue.JS for Calculator 3.0 and work to establish a reliable and repeatable process for keeping abreast of communal updates and support opportunities.	New
• IV&V recommends BHA continue to hold targeted KT sessions with RSM on maintaining Calculator 3.0 using Vue.JS, and determine what additional skillsets, training, and/or resources are needed to support BHA's long-term ownership of Calculator 3.0.	New

IV&V Findings & Recommendations
Project Performance Metrics

#	Key Findings	Criticality Rating
	As of the December reporting period there are no open findings in this category. IV&V will continue to work with BHA to refine the key performance metrics that are most critical to the project.	

IV&V Findings & Recommendations
Organizational Maturity Metrics

#	Key Findings	Criticality Rating
	As of the December reporting period there are no open findings in this category. IV&V will provide its first update on the status of BHA's organizational maturity in the January 2020 reporting period.	

Appendix A: IV&V Rating Scales

Appendix A
IV&V Rating Scales

This appendix provides the details of each finding and recommendation identified by IV&V. Project stakeholders are encouraged to review the findings and recommendations log details as needed.

- See Findings and Recommendations Log (provided under separate cover)
- IV&V Assessment Category Rating Definitions

(G) The assessment category is under control and the current scope can be delivered within the current schedule.

The assessment category's risks and issues have been identified, and mitigation activities are effective. The overall impact of risk and issues is minimal.

The assessment category is proceeding according to plan (< 30 days late).

(Y) The assessment is under control but also actively addressing resource, schedule or scope challenges that have arisen. There is a clear plan to get back on track.

The assessment category's risk and/or issues have been identified, and further mitigation is required to facilitate forward progress. The known impact of potential risks and known issues are likely to jeopardize the assessment category.

Schedule issues are emerging (> 30 days but < 60 days late).

Project Leadership attention is required to ensure the assessment category is under control.

(R) The assessment category is not under control as there are serious problems with resources, schedule, or scope. A plan to get back on track is needed.

The assessment category's risks and issues pose significant challenges and require immediate mitigation and/or escalation. The project's ability to complete critical tasks and/or meet the project's objectives is compromised and is preventing the project from progressing forward.

Significant schedule issues exist (> 60 days late). Milestone and task completion dates will need to be re-planned.

Executive management and/or project sponsorship attention is required to bring the assessment category under control.

Appendix A
Criticality Ratings

Criticality Rating	Definition
H	A high rating is assigned if there is a possibility of substantial impact to product quality, scope, cost, or schedule. A major disruption is likely, and the consequences would be unacceptable. A different approach is required. Mitigation strategies should be evaluated and acted upon immediately.
M	A medium rating is assigned if there is a possibility of moderate impact to product quality, scope, cost, or schedule. Some disruption is likely, and a different approach may be required. Mitigation strategies should be implemented as soon as feasible.
L	A low rating is assigned if there is a possibility of slight impact to product quality, scope, cost, or schedule. Minimal disruption is likely, and some oversight is most likely needed to ensure that the risk remains low. Mitigation strategies should be considered for implementation when possible.

Appendix B: Inputs

Appendix B
Inputs

This appendix identifies the artifacts and activities that serve as the basis for the IV&V observations.

Meetings attended during the December 2019 reporting period:
1. Daily Scrum meetings (selected)
2. Twice Weekly RSM Issues Meeting
3. Sprint Planning for Release 3.4
4. Weekly CCB Meeting
5. Weekly BHA-ITS Project Status Meeting
6. Calculator 3.0 Knowledge Transfer
7. Weekly Change Planning for Dev
8. Phase 3 Deployment Planning Meeting
9. Bi-Weekly Check-in: CAMHD
10. Bi-Weekly Check-in: DDD

Eclipse IV&V® Base Standards and Checklists

Document

Artifacts reviewed during the December 2019 reporting period:
1. Daily Scrum Notes (selected)
2. Twice Weekly Issues Meeting Notes (selected)
3. Mod 3 and Mod 4 timeline

Appendix C: Project Trends

Appendix C
Project Trends

Trend: Overall Project Health											
Process Area	2019		2020								
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Sep
User Story Validation	N/A										
Test Practice Validation	N/A										
Sprint Planning	N/A										
Release / Deployment Planning	N/A										
OJT and KT Sessions	N/A										
Targeted KT	N/A										
Project Performance Metrics	N/A										
Organizational Maturity Metrics	N/A										
Total Open Findings	N/A	**3**									
Issue - high	N/A	0									
Issue - medium	N/A	0									
Issue - low	N/A	0									
Risk - high	N/A	0									
Risk - medium	N/A	0									
Risk - low	N/A	0									
Preliminary Concern	N/A	3									

ID	Identified Date	Summary	Observation	Significance	Recommendation	Updates	Process Area	Type	Priority	Status	Closure Reason	Iteration	Risk Owner
1	12/31/19	**Detailed investigation into the project's sprint planning processes and adoption of generally accepted agile best practices.**	IV&V is currently investigating the following topics as they relate to Sprint Planning and the project's overall approach to agile software development: - IV&V acknowledges that the project is now planning three sprints outs, however, it appears that only a "high-level" sprint planning roadmap has been produced, and it is unclear exactly how the project is targeting features for each release through the end of Mod 4. - IV&V is not aware of how the project is currently defining "done" for Mod 3 and Mod 4 Additionally, in the January 2020 reporting period, IV&V will seek additional information and visibility into the project's processes specific to prioritizing requests and how user stories in TFS are tagged to features, as well as the realignment of project development and configuration resources to complete the scope of Release 3.5.	While having a high level roadmap is good, the project should be able to identify what feature enhancements will be targeted for each planned release. This roadmap will help the project manage scope and productivity. Relatedly, the "definition done" is an important artifact to ensure that the project is successful. Otherwise, the project will struggle to prioritize requests/enhancements and manage scope.	As much as possible, the project should identify what feature enhancements will be targeted for each Release and should clearly map out the roadmap out through the last Phase 3 release in September 2020. Additionally, the project should clearly define "Done" to ensure the project team is working towards the same goal and increase opportunities for success. Having a clear "definition of done" will help provide the project with guidance on how to stay within scope.		Sprint Planning	Concern	N/A	New		General	V Ramesh
2	12/31/19	**Production releases are deprecated and "breaking" existing functionality in production, which could indicate gaps in regression testing processes.**	R3.3 introduced a defect that deprecated features in production specific to Integrated Support and Life Trajectory functionality. DDD has informed IV&V that there are other examples of functionality being deprecated after a release, some of which are still being investigated. As of this report, IV&V has not evaluated the project's root cause analysis (RCA) process used to determine why such functionality was deprecated but will discuss further with BHA in January 2020	Thorough vetting and validation of regression test cases is necessary to prevent both defects and the deprecation of production functionality when a release is pushed live. When defects occur in production, the project should follow a defined and repeatable process for determining the root cause of the problem.	IV&V suggests that business users thoroughly validate all test cases associated with each user story and flag those needing regression testing. Also, to the extent possible, BHA should explore test automation to support regression test efforts.		Test Practice Validation	Concern	N/A	New		General	D Macdonald
3	12/31/19	**Usage of open source JavaScript framework for development and ongoing maintenance of Calculator 3.0 requires BHA to take a proactive approach to support and security.**	IV&V learned in December 2019 that the Calculator 3.0 functionality is built in Vue.JS, an open source JavaScript framework. As this framework is relatively new, the open source support community is small. IV&V's concerns include: - The availability of reliable support for Vue.JS - The project's understanding of any known vulnerabilities with Vue.JS, and development of a process to remain current on vulnerabilities discovered by the support community. - The RSM lead for Calculator 3.0 went on extended parental leave in December 2019 IV&V acknowledges that BHA has downloaded Vue.JS to start getting familiar with it	Open source tools and frameworks offer organizations great opportunities to build and configure customized solutions at lower costs than through software purchase or licensing. However, open source tools and frameworks often do not come with support models, other than those offered through the tool's community. Because of this, the organization bears the weight of seeking out reliable help and support, as well as much take a proactive approach to security and identifying any vulnerabilities in the tools.	IV&V recommends BHA research and determine the long-term sustainability of Vue.JS for Calculator 3.0 and work to establish a reliable and repeatable process for keeping abreast of communal updates and support opportunities. Additionally, IV&V recommends BHA continue to hold targeted KT sessions with RSM on maintaining Calculator 3.0 using Vue.JS, and determine what additional skillsets, training, and/or resources are needed to support BHA's long-term ownership of Calculator 3.0.		Targeted KT	Concern	N/A	New		General	D Macdonald