Business Case for
State Longitudinal Database System for P-20W Education

Oregon Education Investment Board
Office of the Chief Education Officer

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Business Case – Authorizing Signatures

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Executive Summary

The Oregon Education Investment Board (OEIB) was created in 2011 with the purpose of "ensuring outcomes for public school students by overseeing a unified public education system that starts with early childhood services and continues throughout public education from kindergarten to post secondary education." The state's educational outcomes are defined by outcome goals (40% of students with a 4-year degree or higher; 40% of students with an associates degree or professional/technical certification; and the remaining 20% completing high school). These goals are known as 40/40/20.

Functionally, the OEIB operates by staffing the OEIB board and other boards and commissions; engaging individual districts, community colleges, and public universities in a data-based Achievement Compact process tied to 40/40/20 goals; meeting with stakeholders to identify barriers and to create more equitable and seamless systems; analyzing existing and recommending new policies; and recommending new strategic investments or systems of investments to improve state performance.

The key OEIB partnership agencies are:

Early Learning Commission (ELC)
Oregon Department of Education (ODE)
Higher Education Coordinating Commission (HECC)
Community College and Workforce Development (CCWD)
Oregon University System (OUS)
Teacher's Standards and Practices Commission (TSPC)
Oregon Employment Department (OED)
Oregon Health Authority (OHA)
Department of Human Services (DHS)
Oregon Youth Development Council (YDC)
Student Assistance Commission (SAC)
Public School Districts
Community Colleges
Public Universities

A complete list of the acronyms used throughout the plan can be found in Appendix 6: OEIB-SLDS Project Definitions and Acronyms List

Because the OEIB functions require data sharing, at its inception the OEIB was charged with creating a data system. The OEIB is behind schedule with respect to creating this system and this has prevented the creation of policies and strategic investment strategies informed by Oregon data. This business case is written in direct response to SB 5518A, which stipulated the presentation of this business cases as well as a set of associated project management materials to the February 2014 legislative session as a pre-requisite to receive funding to complete this project. A combined OEIB-ODE project team completed this case, with expert support from HECC, CWD, and OUS, and technical support from Department of Administrative Services (DAS) and the Legislative Financial Office (LFO). The project's title is the OEIB Student Longitudinal Database System for P-20W Education (OEIB-SLDS).

Problem Definition

After extensive stakeholder interviews, the following problems were identified as being within the scope of the OEIB and its legislative charge with respect to a data system:

1. The OEIB does not have a method to measure the return on the state's strategic investments and report those results to policy makers. These measures require longitudinal data to show effects of investments over time across institutional and sector boundaries. In particular, the OEIB has formed an achievement compact with districts, community colleges, and public universities all of which are related to the statewide goal of 40/40/20. Current policy research regarding the efficacy and effect of achievement compact targets are currently not informed by Oregon longitudinal data.
2. Among institutions, between levels and across sectors, data transfer and sharing is inefficient. This leads to increased work load, delays in appropriate program assignment, "shadow" methods of data sharing, data error or duplications, and other problems that do not support student growth or efficient school operations. In addition, the lack of common "early warning systems" also effect appropriate program assignment.
3. Students do not have equitable direct access to their own longitudinal record and tools to set college and career goals and develop plans of study. This type of tool is provided by some districts, but it is not universally available and it is lost if a student transfers to a district not using the same system. In addition, there is no Personal Achievement Record (PAR) that records pre-school, post-secondary, or workforce data. Finally, there is no universal method for a student to capture data regarding credit by proficiency or credit for prior learning.

Alternative Solutions.

In order to develop a set of alternatives, the project team did extensive research on the on-going efforts in all other states and the recommendations for the US Department of Education. The team also consulted with experts in Oregon who already collect and warehouse student data. In particular, the team consulted with the ALDER Executive Committee, which has been leading the existing longitudinal data efforts in Oregon and the Early Learning Council (ELC) Data Governance Committee, which is leading the effort to integrate cross-sector data (health, human services, and education) for early learning. Finally, the project team contracted with RNR Consulting, Inc. to review and define the alternatives, analyze them against a set of criteria, present a method for the project team to score the alternatives, and select the best alternative.

Across the country, most states are working on building longitudinal educational systems. OEIB's project goals are similar in some respect to other states, however Oregon is unique in having Achievement Compacts and in proposing the Individual Educational Record. Nationwide, longitudinal educational systems fall into two general categories with respect to the how the statewide longitudinal database is designed. One method, a centralized approach, creates a large statewide database with personally identifiable information that serves many users with different views and services. The other method, a federated approach, creates a limited statewide database with de-

identified data that servers a smaller number of users with different views and services. There are different types of centralized and federated approaches and in this business case a variety of alternatives were considered.

Four centralized approaches were considered.

Alternative 1 would replace student information, human resource, and financial systems in all public K-12 districts, community colleges, and universities and create a new state OEIB data warehouse that serves all staff and students.

Alternative 2.1 would replace student information, human resource, and financial systems in all public K-12 districts and create a new state OEIB data warehouse that serves all staff and students.

Alternative 2.2 would replace student information systems in all public K-12 districts and create a new state OEIB data warehouse that serves all staff and students.

Alternative 3 would create a new state OEIB data warehouse that serves all staff and students.

Two federated approaches were considered.

Alternative 4 would create a de-identified longitudinal database that is collected from existing systems at the ODE, CCWD, OUS, and the HECC, give technical support to the HECC during its reconfiguration, and create a Personal Achievement Record (PAR) for all students.

Alternative 5 would create a de-identified longitudinal database that is collected from existing systems at the ODE, CCWD, OUS, and the HECC, support the HECC during its reconfiguration, and mandate a new Personal Achievement Record (PAR) requirement for schools/agencies.

Alternative Analysis

Each alternative was extensively analyzed and developed in order to compare against a set of criteria. The project team, starting with information supplied by RNR based on their expertise, developed the criteria and weights based on input from the OEIB, ODE, HECC, and the Governor's office. In particular, the project team increased the weight given to cost, risk, and information security.

Evaluation Criteria				
Alignment with OEIB goals and functionality	Costs	Risk exposure	Security	Future opportunities
30%	15%	25%	20%	10%

For each alternative, RNR estimated the 5-year total project costs to be:

Alternative 1	Alternative 2.1	Alternative 2.2	Alternative 3	Alternative 4	Alternative 5
$91,907,949	$54,103,575	$38,247,110	$11,147,961	$8,595,102	$6,144,546

These costs do not include local implementation costs (staff release time for training, data conversion costs, training for new employees after initial implementation, etc.). In addition, these costs are for basic SIS and ERP systems; districts, colleges, or universities that require additional modules and/or functionality would incur additional local costs.

Recommendation: Alternative 4: A de-identified longitudinal database that is collected from existing systems at the ODE, CCWD, OUS, and the HECC; technical support to the HECC during its reconfiguration, and a new Personal Achievement Record (PAR) for all students.

Based on the Project Team's analysis and rankings and the discussions and decision of the agency leaders, the rationale for choosing Alternative 4 is as follows:

1. Alternatives 1, 2.1, and 2.2 are all too costly and carry too much project risk. Because of the clear benefits to having standardized Student Information Systems (SIS) and Enterprise Resource Planning (ERP) systems, the project team sees the value in such approaches; however the value is not great enough to recommend this as a task for the OEIB.
2. Alternative 3 is the least costly centralized approach. It provides for future applications beyond a policy database. However, creating a new data warehouse that will contain live personally identifiable data carries unacceptable project risk; also, it does not leverage and build on existing work.
3. Because we are not able to capture local impacts of centralized approaches, all of the centralized models will incur unknown level of costs and programmatic changes to the local districts, colleges, and universities. This adds unacceptable risks to the success of this project.
4. The federated models (4 and 5) are the least costly and least risky. They have the least impact to schools, districts, colleges, and universities.
5. Federated models have been chosen and implemented successfully in other states.
6. A federated model is broadly understood by the staff at OEIB, ODE, CCWD, and HECC and it is the favored design option
7. Alternative 4 and 5 builds on existing efforts, standards, relationships, and sharing agreements between the ODE, CCWD, OUS, HECC, OED, OHA, and DHS.
8. Alternative 5 meets the requirement for a Personal Achievement Record (PAR) by enacting an unfunded mandate on districts, colleges, and universities. The cost savings of 5 versus 4 are transferred in whole or part to institutions.
9. Alternative 5 will be more sensitive to data loss or errors when students change schools.
10. The Personal Achievement Record (PAR) of Alternative 4 provides greater future benefits. Having a standard and responsive design will make the platform more

predictable for developers and thus enable the faster creation of goal setting and planning tools for students.

Much of Alternative 4 can be completed quickly: it is largely based on existing systems and sharing agreements and methodologies. The creation of de-identified longitudinal records and business intelligence (BI) solutions that will be available to improve the work of the OEIB, other agencies, and the legislature is a well-defined and easily attainable task. Alternative 4 will also immediately support the HECC as it transitions to being the owner of all post-secondary data. Alternative 4 will also create a new governance structure that will set future policy priorities and negotiate data sharing agreements to promote more seamless inter-agency sharing.

The creation of the Personal Achievement Record (PAR) is new work and it will require at least a year of further refinement of the requirements for this system that involves a broad range of stakeholders across the state. The funding recommended in this business case will support the PAR development using an iterative process where designs are developed, shared with stakeholders, revised and shared again until a consensus design is achieved. The PAR can provide a significant return on investment by increasing graduation rates and college and university completion rates: universally available self-assessment, goal setting, and guidance tools will result in higher student engagement and achievement. The final system could either be developed internally by the ODE, HECC, or OEIB or purchased through a competitive bid process.

Expected financial benefits of the OEIB-SLDS

- Better informed new strategic investments
- Increased high school graduation rates and increased rates of students entering post-secondary schools
- The ability to evaluate of the effectiveness of current strategic investments to determine where best to spend in the future
- A coordinated and more sensible budget requests from historically disjointed agencies that solves problems more economically
- A more granular view of the data with respect to specific interventions and expenditures and their affects on student achievement that provides business intelligence to districts, schools, community colleges, and universities to improve their budgeting
- The ability to comprehensively track expenditures and outcomes across agencies (i.e. Early Learning Hubs) will allow for better cost/benefit analysis
- Enhanced operational coordination between agencies and reduction of duplicated efforts between institutions

Expected non-financial benefits of the OEIB-SLDS

- A secure longitudinal data system that provides no access to identifiable data and no link to live data
- A scoreboard that shows statewide longitudinal progress towards educational goals that lead to 40/40/20
- Support for coordinated P-20W policy analysis and policy recommendations

- Connection to the emerging Early Learning data system, which will allow for staff to benefit from cross-sector knowledge
- Universal support for all students to understand their achievement, set goals, track progress, and share data with schools and employers
- Improved ability to support local and regional Achievement Compacts by supplying local longitudinal data and business intelligence tools
- Reduced workload for districts, community colleges, and universities to submit achievement compact goals and data
- The opportunity to easily research, analyze, and build predictive models informed by a deep set of Oregon student data that spans P-20W
- Support for continued or expanded data sharing with other agencies

This business case and associated documentation also includes a project plan with four phases and a three-year budget. The first deliverable will be the business intelligence solutions for the Legislature and other boards and commissions, OEIB, ODE, HECC, and other agencies. This will require immediate support for the HECC and the OEIB to build or buy new systems and it will require a new Data Governance Committee to set priority directions. The second deliverable will be the Personal Achievement Record, which will take more time to develop in order to involve stakeholders in design specifications. OEIB will be the lead agency for this project; however, the OEIB sunset provision for this database is that ownership will go to the HECC in August 2015.

Purpose and Background

Purpose

The objective for creating a State Longitudinal Database System for P-20 Education is to support the achievement of State educational goals. In 2011, Senate Bill 253 created numerical targets for the system as a whole. These targets, referred to as “40/40/20”, set outcome targets for Oregonians in terms of 4-year degrees (40%), associates degrees or professional/technical certifications (40%), and high school completion (20%).

This is a high standard to achieve. In Oregon, the high school graduation rate has persistently remained below 70%, opportunity gaps persist for groups of students, a majority of students are not proficient or higher in reading at the 4th grade level, and the state ranks 49th in the percentage of recent high school graduates going to college.

To help achieve the 40/40/20 goals, Senate Bill 909 (SB 909) created the Oregon Educational Investment Board (OEIB) with the purpose of, “of ensuring equitable outcomes for public school students by overseeing a unified public education system that begins with early childhood services and continues throughout public education from kindergarten to post-secondary education”. A system is “equitable” when achievement rates are the same for students regardless of their membership in a particular group (income level, race, native language, etc.). Governor Kitzhaber is the Chair of the OEIB board, which has established benchmark targets for institutions and agencies. The OEIB board also recommends strategic investments targeted to improve specific outcomes.

The OEIB is also a new state agency, led by the Chief Education Officer, Nancy Golden. OEIB supports the work of the OEIB board, and facilitates its three sub-committees: Outcomes and Investments, Best Practices and Student Transitions, and Equity and Partnerships. Its additional overarching roles and responsibilities are: (1) An aligned P-20 system; (2) Student Outcomes; (3) Strategic Investments; and (3) P-20 Leadership. The agency currently has the allocated staffing to conduct policy research and design tools for measuring the return on these strategic investments; however, they lack access to longitudinal outcome data.

The key OEIB partnership agencies are:

Early Learning Commission (ELC)
Oregon Department of Education (ODE)
Higher Education Coordinating Commission (HECC)
Community College and Workforce Development (CCWD)
Oregon University System (OUS)
Teacher’s Standards and Practices Commission (TSPC)
Oregon Employment Department (OED)
Oregon Health Authority (OHA)
Department of Human Services (DHS)
Oregon Youth Development Council (YDC)
Student Assistance Commission (SAC)

A complete list of the acronyms used throughout the plans can be found in Appendix 6: OEIB-SLDS Project Definitions and Acronyms List

The state of Oregon spends over $10 billion each year on public education, which includes funding for Early Learning, K-12, community colleges, and public universities. Across levels and sectors, stakeholders report insufficient access to data with respect to investments and outcomes. This is especially true when the targeted outcomes are affected or measured by spending from multiple agencies, institutions, and sectors.

The OEIB governs cross-agency work across a broad scope of topics, establishes "achievement compacts" with districts and institutions that articulate specific benchmark goals and targets, supports and funds regional inter-agency collaboration, and works with the legislature and partner boards and commissions to develop and improve educational policy. The creation of the "unified public education system" requires coordination among institutions (early learning, public K-12 schools, community colleges, universities, and public/private professional or technical programs) and state agencies (Oregon Health Authority, Department of Human Services, Oregon Department of Education, Higher Educational Coordinating Commission, and the Oregon Employment Department). See Appendix 1 (Oregon State Educational System Governance Chart) for a diagram of the relationship between the OEIB agency and other state agencies and institutions.

With respect to its place in the public education governance structure, its goal and mission, OEIB has identified business drivers that will be supported with a Longitudinal Database. These include an improved ability to make optimal strategic investments, improved support and monitoring of the local work of districts, institutions, and regional collaborations, and enhanced support for individual students to be better agents in their own learning.

The mandatory requirement for this project exists in SB 909, where the OEIB was charged with:

> (4)(c) Providing an integrated, statewide, student-based data system that monitors expenditures and outcomes to determine the return on statewide education investments. The board shall provide the data system described in this paragraph by:
>
> (A) Developing the data system or identifying or modifying an existing data system that accomplishes the goals of the data system; and
>
> (B) Ensuring that the data system is maintained.

The original timeline was:

> SECTION 7. The Oregon Education Investment Board established by section 1 of this 2011 Act shall ensure that the statewide data system described in section 1 (4)(c) of this 2011 Act is operating on or before June 30, 2012.

The subject of this business case is the data system referenced above. The key requirements for data integration, statewide data architectures, and student level data relate directly to the problems with the current systems in place across the state. Interviews conducted for this case with stakeholders provided requirements for this data system. The stakeholders included the

data producers (districts, institutions, ODE, CCWD, OUS, HECC, OHA, DHS) and projected consumers (legislators, the Governor's office, boards and commissions, policy analysts, institutional staff, students, and research partners) for the data system. These stakeholders represented different regions of the state, different institutional levels and sizes, teachers and administrators, and various community groups.

The purpose of this business case is to recommend a solution from a set of alternatives that meets the directives of SB 909, addresses the requirements of this data system, capitalizes on opportunities to improve educational performance, controls risk, and minimizes cost. Because the OEIB has not met the timeline requirements referenced above, some action on this case must happen immediately. Therefore, all of the alternative solutions will be required to produce one key deliverable--a tool for measuring outcomes and expenditures—in the first year.

Questions that legislators face are increasingly complex and the proposed solutions are often nuanced. An OEIB-SLDS, with a dashboard showing progress and the option to dig deeper into the statewide data, is a critical tool that is missing. This is an opportunity for improvement with respect to statewide policy development and expenditures.

Background

Activities in Other States: Centralized versus Federated

The problems, opportunities, requirements, and alternatives outlined in this business case are comparable to projects in existence in most every state across the country. There is broad agreement in educational research that access to and analysis of longitudinal outcome data allows for better educational expenditures. The US Department of Education's Institute for Educational Sciences (NCES) provides a clearinghouse of research on the importance of data based decision-making (http://nces.ed.gov/programs/slds/). All states, including Oregon, have participated in federally funded projects to create longitudinal data systems that link data from preschool through public schools and into post-secondary and the workforce. In Oregon, that work has been managed by the Oregon Department of Education and the federal grant is known as Project ALDER.

Among the 50 states, the work is very similar. The questions asked with respect to the goals and the design of an SLDS in Oregon are essentially the same questions asked across the country. However, one major defining feature that distinguishes the different state approaches is whether the SLDS is "centralized" or "federated". Centralized systems imply that a central body owns a significant data warehouse of real-time student data. Federated systems rely on other institutions to collect and maintain day-to-day data and then to send extracts to the smaller central system. There are successful examples of both approaches across the states; the NCES provides comparisons and contrasts of the two approaches as gleaned from years of state experience and this data was taken into account throughout the development of this case.

Project ALDER

In 2010, Oregon was awarded $10.5M to further the design and implementation of a statewide longitudinal data system (SLDS). The grant (Advancing Longitudinal Data for Educational

Reform, ALDER) was awarded to aid the work already underway in the state creating connections between teacher and student data, while developing partnerships to integrate and expand data collected on early childhood and college success. The funding through the American Recovery and Reinvestment Act (ARRA) of 2009 supports the development and implementation of foundational data systems that enable the creation of solutions allowing educational stakeholders to examine student progress from early childhood into career, including matching teachers to students, while protecting student privacy and confidentiality consistent with applicable privacy protection laws (i.e. The Family Education Rights and Privacy Act, FERPA**)**.

The following outcomes were agreed upon by the ODE and the US Department of Education:

1. The development of a robust teacher-student data linkage
2. Collection and retention of pre-school data and linkage to K-12 records
3. Development of a comprehensive statewide data quality plan.
4. Data system development for exchange and integration of post-secondary success/community college/workforce data

The first goal, the ability to link teachers to students by classroom and subject, is critical to understanding the connection between teacher training and qualifications and student academic growth. The development of a robust educator-student data linkage is the major emphasis of Project ALDER and the USDE. The Oregon Department of Education, in collaboration with Local Education Agency stakeholders and the Teacher Standards and Practices Commission (TSPC), has effectively completed development of the robust educator-student data linkage (ESDL). To bridge the gap between teacher and student unique secure identifiers, ODE developed and implemented an Instructional Unit Identifier (IUID). Data elements include a standardized course code, term identifier, class period code, classroom ID, and school code. This goal is complete.

With respect to the second goal, the legacy Pre-K database consisted of a single web-based application for the collection of child-level data across Oregon Head Start Prekindergarten (OHS PreK) and Early Intervention/Early Childhood Special Education programs (EI/ECSE). In May 2011 SB 909 was passed changing requirements for early childhood services and education. To guide this new work a stakeholder group was formed, the ALDER Early Childhood Workgroup. This group evaluated and selected an early childhood formative assessment. A universal early childhood formative assessment was implemented statewide in August 2013. The data is now being integrated into the ALDER system. ALDER partners are working successfully to integrate both existing and newly mandated early childhood data sources into the ALDER data system. The work is on schedule.

Goal Three's comprehensive statewide data quality plan focuses on data quality throughout its lifecycle in ODE and partner source systems, longitudinal systems, and in shared systems such as the interagency Operational Data Store known as CORE. Critical to the development of a Comprehensive Statewide Data Quality Plan (CSDQP) is a shared vocabulary among partner agencies, regarding data quality and data governance. To this end, Project ALDER partners adopted the Data Management Association's Functional Framework, which classifies data management into ten functions and serves to provide a unified foundation for further work. Work has begun in several key areas: (a) development of a search system to expose

metadata to all data suppliers and consumers, (b) development of a messaging system to inform all data suppliers and consumers of data-related issues, (c) development of infrastructure to support post-collection validation (e.g., validations conducted on aggregates, validations conducted against other data sources, validations based on previously published data), and (d) requirements gathering for expansion of our metadata systems to include information on data quality. The work of this outcome manifests itself in the field through the Oregon DATA Project (SLDS FY 07), which has developed and implemented data use and quality curriculum throughout the state. Accessible data and governance are the most critical risks. Assuming progress on these two issues, all outcomes under Goal 3 are on schedule and budget.

The final goal has been the chief responsibility of the ALDER Executive Committee (AEC), which is charged with establishing interagency data governance and overseeing grant activities. Data exchange agreements have been executed with a subset of partners and governance processes and procedures for wider-ranging data exchanges are in development. In a pilot project, ODE has successfully exchanged higher education and workforce data via the Western Interstate Commission for Higher Education (WICHE) subproject, a national first, across four states (Oregon, Washington, Hawaii, and Idaho). This data exchange demonstrates the ability to create a more robust picture of human capital development and cross-state education and workforce outcomes; however, this type of remains an ad-hoc example of capabilities of a completed and seamless system. The ALDER Technical Work Group is developing a data matching system providing the capability to link data from different sectors as a tool for business intelligence solutions serving P-20W. The greatest barrier to success in completing Goal 4 will be the availability of data from different sectors, appropriate governance structures and processes, and access to the technical/stakeholder resources needed for success. The outcomes for Goal 4 can be completed from a technical perspective. The key issues therefore involve process improvements, allocation of resources, and appropriate direction.

In the course of the development of this Business Case, the OEIB has joined with the AEC to address the key issues with respect to Goal 4. This partnership is necessary because ALDER's progress with respect to this goal is critical to the analysis of alternative solutions that meet the OEIB Longitudinal Data System requirements. Building on ALDER's successes could represent an economical solution to the problems confronted by the OEIB.

At the December 2013 AEC meeting, the members addressed these topics and made recommendations for action. The key AEC proposal is the creation of a governance function that would articulate the policy priorities for a statewide educational data system and be available to make decisions when the AEC cannot come to a consensus regarding data sharing and access. The OEIB Board could perform this function.

Regional Data Warehouses and KIDS

The current strategy in K-12 is that districts collect critical student, staff, and financial information. All districts then report specific information to the Oregon Department of Education and this information is collected in a number of repositories, including the K-12 Integrated Data System (KIDS). These data form the basis of Oregon state reporting, priority and focus school determination, funding formulas, and other critical functions.

Most districts participate in a Regional Data Warehouse collaborative. The six regional warehouses are: Beaverton School District, Eugene 4J Consortium, Hillsboro School District, Linn Benton Lincoln Education Service District, Portland Public Schools, Salem-Keizer Schools, and Willamette Education Service District (includes the Northwest Regional Education Service District). These data warehouses perform some of the state reporting for districts and provide some degree of analysis tools for staff in the participating districts. The nature and extent of these tools vary from warehouse to warehouse. The data in these warehouses are similar with respect to what data elements are tracked and for how many years data exist. The Data Warehouse Governance Committee (DWGC) has representatives from each regional data warehouse and the ODE who meet regularly to improve the pipeline of data from schools to the ODE with respect to data quality and organizational efficiency. The DWGC is a forum to share best practices and to explore methods to reach 100% participation from all Oregon districts.

Data Warehouses for Community Colleges and Public Universities

The Oregon University Chancellors Office has maintained a historical data warehouse for 15 years. This information includes a restricted set of common student, course, degree and faculty information from all of its member schools (University of Oregon, Oregon State University, Portland State University, Western Oregon University, Southern Oregon University, Eastern Oregon University, and Oregon Institute of Technology). These data are collected each term in the Student Centralized Administrative Reporting File (SCARF) and used for distributing state funds, evaluation of programs, populating predictive models, reporting performance, auditing programs, and developing policy

In June 2014, University of Oregon, Oregon State University, and Portland State University are effectively leaving the OUS. Currently, the plan for the OUS going forward is to maintain a fraction of its current Institutional Research staffing to support the remaining Board and four universities. It is not clear whether and how the SCARF collection will operate beyond 2014. What is clear is that, in order to meet the existing functionality with respect to data collection, the HECC will need to coordinate and combine data collections or take on the historical role of OUS to maintain a data warehouse for all public universities. One requirement for the proposed alternatives in this business case is a clear transition plan from the old OUS data scheme to a new method for the HECC.

The Community College and Workforce Development agency maintain the Oregon Community College Unified Reporting System (OCCURS) database that stores data from its 17 member institutions. These data include student level data from each college and are used for state reporting, program evaluation, program improvement, and organization of support services.

In June 2014, the Community Colleges will be governed by the HECC. This situation is analogous to that of the Universities, however there will be no vestige of the old governance model in place. Therefore, HECC is the only agency that will be collecting data from member institutions.

While the specific organizational chart and assignments are not yet final, it is clear that the level of funding for IT support and institutional research for the HECC will be less than the sum

of existing funding at the CCWD and OUS. In the long run, coordination, standardization, and new efficiencies can allow the HECC to meet or exceed the policy analysis efforts of CCWD and OUS.

Workforce Data

The Oregon Employment Department (OED) maintains a data system called PRISM (Performance Reporting Information System), which contains workforce data that is relevant to educators and policy makers. Specifically, PRISM includes data showing employer, wages, and start date, which allows K-12 and post-secondary schools to have one external measure of the success of their programs. OED has participated in Project ALDER since its inception and has participated in limited collaborations with CCWD and OUS to link records between the institutions and workforce outcomes. The work of ALDER has laid the groundwork for more extensive matching of student record data with workforce data.

In June 2013, the OED received $1.2 M to enhance the PRISM system. One of the specific enhancements named in the funding request was a means to report, "*Information on the percentage of those served by the workforce system who choose to stay in school or enroll in school".* Therefore, at the same time that educators are asking the workforce to share data, that request is being reciprocated by the designers of the enhanced PRISM system, who are current collaborators through ALDER and would partner with OEIB in the future.

A key fact about workforce data is that a Social Security Number (SSN) is the only identifier that PRISM uses to capture employment data (employer, start date, salary). Students who attend a Community College or a Public University generally give that information, as do students who receive a scholarship from the Student Assistance Commission (SAC). This allows for longitudinal data that starts with post-secondary. To include K-12 data, a data system would then need to link the PK-12 data using data other than SSN. This chaining together of identities would enable a true PK-20W longitudinal record for the substantial sub-set of students who attend a community college or university.

In order to track students who do not attend post-secondary school, K-12 would need to be authorized to collect and share SSN. Another possible avenue to collect this data would be to partner with other agencies that do collect it. While Oregon currently restricts the use of SSN, other states allow such access under different interpretations of the Federal Privacy Act.

School District, Community College, and Public University Databases

All Oregon public schools have student information systems and business systems that perform human resources and financial functions. These transactional systems are generally purchased products that are customized to individual contexts. Cloud-hosted solutions are becoming more common.

In K-12, a consortium of districts representing over 50% of Oregon students completed an RFP process for a student information system and selected Synergy by Edupoint. A few of these districts implemented Synergy in the 2012-2013 school year with the majority starting in the 2013-2014 school year. Synergy is notable for having a rich parent and student reporting system and a standards-based proficiency grading system in its core grade book.

Historically, there has been resistance in the K-12 system to adopt a common state student information system. One route to achieve this objective has been suggested by superintendents: a solution that is paid for by the ODE, that automates reporting, and that leaves the option for districts to purchase extended feature sets.

The OUS schools all use a common student information product (Banner), but they run different instances and versions of the software. Effective until June 2014, the OUS schools also use a common HR and financial system.

The Community Colleges do not use a common student information system. Instead, they use one of four commercial products. There have not been any recent attempts to have all the institutions use a common system.

Early Learning Commission Data Project

The Early Learning Commission (ELC) is charged with integrating services from all providers who serve students from birth to kindergarten. The Early Learning Division of ODE serves that commission in a similar fashion as the HECC (except that ELD is not a separate agency). One key investment of the ELC is the creation of electronic portfolios of early learning providers and a quality rating system. Another is the creation of Early Learning Hubs that receive funding to develop service models that integrate services to high-risk children (age 0-6). All of the work of the ELC is supported by an ELC Data System Steering Committee, which is working on the policy level and technical level to support data sharing between Oregon Health Authority, Department of Human Services, Early Learning Providers, ODE, and other agencies and programs. The ELC identified 25 possible sources of data as of November 2013 that could be integrated in a final Early Learning data warehouse.

If the OEIB-SLDS is funded, the OEIB will to work in close collaboration with the ELC data work to support it and help define how early learning providers and partners will share data with the longitudinal system. The Early Learning work is the most complex because it crosses agencies that have no history of sharing data. As referenced above, the ALDER partners are working successfully to integrate these data sources into the ALDER data system.

Data Quality Campaign Report

The Data Quality Campaign (DQC) is an independent organization that works to promote and assist in the development of data systems and practices that successfully support school improvement. Forty-nine of the fifty states participate in a survey from the DQC to assess progress of P-20W longitudinal data systems. This survey has 309 questions and results in an overall scorecard with 10 elements that are related directly to Federal targets.

The November 2013 report rated Oregon as a national leader, meeting 9 of the 10 elements. However, this ranking did not compare accurately with our self-assessment of Oregon's progress on these elements. Judging from the published DQC criteria, the OEIB's assessment of progress has Oregon meeting on 7 of the 10 elements. These elements and the self-assessment scores are:

1. Link state K–12 data systems with early learning, postsecondary education, workforce, social services, and other critical agencies – NOT MET
2. Create stable, sustained support for state longitudinal data systems – MET
3. Develop governance structures to guide data collection, sharing, and use – NOT MET
4. Build state repositories (e.g. data warehouses) that integrate student, staff, financial, and facility data – MET
5. Implement systems to provide all stakeholders with timely access to the information they need while protecting student privacy – NOT MET
6. Create progress reports with individual student data that provide information educators, parents, and students can use to improve student performance – MET
7. Create reports that include longitudinal statistics on school performance and groups of students to guide school-, district-, and state-level improvement efforts- MET
8. Develop a purposeful research agenda and collaborate with universities, researchers and intermediary groups to explore the data for useful information – MET.
9. Implement policies and promote practices, including professional development and credentialing, to ensure educators know how to access, analyze, and use data appropriately – MET.
10. Promote strategies to raise awareness of available data and ensure that all key stakeholders, including state policymakers, know how to access, analyze, and use the information - MET

The OEIB self-assessment and the DQC assessment are different. In analyzing the 309 questions and our answers, which led to the DQC assessment, we have a number of possible reasons to explain the difference. The first is that we don't know how the 10 elements are scored with respect to the 309 questions. Oregon answered "no" or 0% to a number of questions in areas presumably connected to elements where we passed. Second, many of the questions where we answered "yes" or gave a percentage match above 0% were correct only on a limited scope (i.e. only a sub-set of data). A more conservative assessment of our status would have led to a larger number of "no" answers. Whatever caused this disparity in the rankings is less important than the fact that the state is clearly not meeting these targets in areas key for our state's educational progress. This is especially true with regard to inter-agency data sharing, governance, and stakeholder access to longitudinal data.

Research Partners

Oregon has a number of local research partners, in the public and private sector, who are both consumers and producers of data and analysis with respect to educational institutions, investments, and outcomes. Examples of these partners are ECONorthwest, Education Northwest, and the Educational Policy Improvement Center (EPIC). Much of the research requires longitudinal analysis of data across institutions. These partners currently match student records after receiving the data from ODE, CCWD, OUS, or another source, because the records are not pre-matched. In addition, the process to request and receive data is not uniform across institutions and the data may or may not be de-identified. Based on a financial analysis of spending on longitudinal projects, research partners spend as much as 20% of their research budget on linking and de-identifying data. In addition, partners report that because there is no official longitudinal database, linking methodology that differs across studies can produce discrepancies in results.

History of the OEIB Longitudinal Data System Project

In parallel to the ALDER project, the original OEIB staff (Chief Education Officer Rudy Crew and Director Michael Seelig) developed a plan in 2012 for the OEIB longitudinal database. That work led to a general plan and proposal to create this system. In response to that initial plan, the OEIB and ODE were directed in a Spring 2013 budget note to develop a business case and supporting documentation.

This Business Case is written in direct response to the following Budget Note:

> **OEIB: Longitudinal Data System, 2013 Legislative Update**
>
> $200,000 for completion of Longitudinal Data System business case
> $10 million in reserved bonding capacity
>
> ODE Budget: SB 5518A, Budget Report
>
> Package 300 (Longitudinal Data System) which provides the resources to create a longitudinal data system for tracking student/school information from early learning through post-secondary education. The package includes $700,000 General Fund for the business plan and equipment replacement. The highest priority for these resources is completion of the business case and related project management materials for the longitudinal data system. Limitation for the actual development costs of the system will be included in the capital construction bill, if approved. The agency is directed to report on the business case and other project planning material when work is completed to either the Interim Joint Committee on Ways and Means, the 2014 Legislature or the Emergency Board.

This timeline of events with respect to the OEIB project is relevant for a number of reasons. First, the original legislation envisioned a functional data system by June 30, 2012 and that target has not been met. Second, the initial attempt at describing the problems this data system is designed to solve led to a perception in many stakeholders' minds that the scope of this project was very broad. Essentially, as the deadlines for the completion of this project slipped, the promises for the deliverables expanded.

These political realities require a categorical response to the legislative, staff, and public expectations. Under the direction of project sponsor, Governor Kitzhaber, and Chief Education Officer, Nancy Golden, OEIB has worked from scratch to identify and disaggregate the problems this system is meant to solve. One of a number of communication tools the project team has used is a frequently asked questions and answers document. The promulgation of that FAQ has led to additional questions and requests for clarification and has served as a communication vehicle to orient stakeholders. The most current version is attached in Appendix 2.

Problem or Opportunity Definition

This section outlines the problems associated with the lack of a data system for the OEIB, the lack of a cohesive data system for the agencies and institutions managed by the OEIB, and lack of a student-centered data system. It also describes the opportunities that could be achieved by implementing the proposed OEIB longitudinal data system.

With respect to the identified problems and opportunities, the OEIB team has identified key business drivers relevant to the proposed implementation of the new OEIB data system. These include:

- Improved ability to support optimal investments and conduct policy analysis and research
- Improved ability to support local and regional Achievement Compacts
- Enhanced operational coordination between agencies
- Enhanced support for individual students to understand their achievement levels, set goals, track progress, and share data with schools and employers

Each of these business drivers is further described below with respect to the major problems currently faced by the OEIB, and the opportunities the OEIB can take advantage of by the implementation of a new data system. These problems and opportunities were developed through a review of prior work in this area by the Oregon Department of Education, interviews and workshops with various stakeholders and through analysis by the OEIB project team.

Optimal Investments and Policy Analysis and Research

Oregon spends over $10 billion annually for public education but does not have systems in place to allow policy makers to evaluate the effectiveness of those expenditures. In response, the law creating the Oregon Education Investment Board (Senate Bill 909) stipulated the creation of a longitudinal database to track and evaluate these returns on investments. The state has not integrated educational longitudinal databases across the various sectors of education, i.e. early childhood, public K12 schools, community colleges, universities. Finally, the state has not connected employment outcomes to educational data to evaluate program effectiveness.

It is the charge of the OEIB to recommend strategic educational investments, evaluate their efficacy, and report to the legislature. In June 2013, the legislature approved $75 million of targeted funding meant to improve teacher preparation, early literacy, STEM education, Career and Technical Education, and students' transition from high school to college. Data is required to track the success of these investments and to be the basis for the suggestion of new investments and new policies. In addition, other state agencies make investments that are meant to coordinate with the work of the OEIB. Finally, the OEIB, partner agencies, and researchers require non-personally identifiable data.

Table 1: Problem and Opportunity Analysis: Improved ability to support optimal investments

Problem Definition	Opportunity with State Longitudinal Database System	Benefit to OEIB and Schools
Investment Tracking. The OEIB recommends investments to the legislature. It also has governance responsibility for the Oregon Department of Education, The Higher Education Coordinating Commission, and the Early Learning Council, all of which also make strategic investments. These investments are currently not tracked in any data system.	The proposed OEIB SLDS will provide a repository to capture strategic investment allocations made over time to institutions or regional collaboratives. These strategic investments are above and beyond formula based allocations and are intended to help meet the achievement compact and state educational goals. Each of the investments has its own internal metrics for success and requirements to how the money is specifically spent, all of which will also be captured in this repository.	The ability to comprehensively track investments across agencies will allow for better cost/benefit analysis. This system could also allow for coordinated and more sensible budget requests from these historically disjointed agencies. A more granular view of exactly what practices are being implemented allows for better analysis.
Outcome Tracking: The OEIB's goals as an agency are all tied to statewide educational outcomes at different levels of the system. The data required to track our progress towards these goals are currently present in separate agency databases that do not generally share information with each other.	The OEIB SLDS will allow for the collection of performance data from the ODE, HECC, ODE, OED, DHS, OHA, and OYA.	The ability to comprehensively track outcomes across agencies will allow for better cost/benefit analysis. The ability to report consistent and coherent outcome data allows for clearer communications from the OEIB.
Policy Development and Research: OEIB staff work with the OEIB board and associated agencies and boards to develop policy proposals to help shape investments, statutory changes, and administrative rules. Policy Research planning activities currently do not have a supporting data system to construct cost/benefit models. In addition, external research partners have difficulties easily providing services because of the complexity of needing to negotiate with multiple agencies and institutions.	The OEIB SLDS will allow for comprehensive cost/benefit analysis. The Data System will contain non-personally identifiable information that is easily accessible for analysis by internal and external parties.	Current policy development in agencies whose goals overlap with respect to statewide educational goals occurs in isolation. A standardized and universally accepted system for analysis can catalyze more coordinated efforts, better agency communication, and increased overall efficacy.

Local and Regional Achievement Compacts

The OEIB has established a system of Achievement Compacts that require institutional goal setting as part of the systemic statewide plan to reach 40/40/20. Data is currently being collected from every public school district, community college, and university in the state. In addition, many regions of the state have authored Regional Achievement Compacts that also involve goal setting and reporting. However, neither the OEIB nor the legislature has a data system to store, analyze and report Achievement Compact data.

Achievement Compacts are a key component to the overall design of the OEIB strategic plan. Under the OEIB Objective #3, Adopt Strong Policy Framework, an objective for the agency is to provide “tight-loose” direction. Tight-loose is a term that refers to the notion of the OEIB and Governor articulating specific outcomes (tight) and allowing for institutions and agencies the flexibility to approach local, context-relevant approaches to meeting those outcomes (loose). This approach is designed to maximize local buy-in to the planning and implementation process while keeping all stakeholders focused on a common end. However, such a system is vulnerable to chaos and lack of desired outcomes unless there is a method to track and give feedback to the local planning groups. The Achievement Compacts and the attendant analysis process is the OEIB’s method of tracking and giving meaningful feedback.

The phenomena of Regional Achievement Collaboratives (RACs) arose organically in areas of the state where local education leaders decided to partner with each other and other agencies to coordinate their efforts. Following the model for the local compacts, these regional groups are generating regional compacts complete with plans and goals. Because this approach has generated great interest and collaborative activities, the OEIB has now encouraged the same approach across the state. It designated three groups (Eastern Promise in eastern Oregon, All Hands Raised in Portland, and Connected Lane County) as mentors it is providing technical assistance to the RACs across the state.

The amount of serious effort occurring spontaneously and now supported with State funding is considered to be a positive occurrence. This ongoing work puts an even greater focus on the OEIB’s role in fostering these RACs and providing meaningful data based feedback. Timely and specific feedback will reinforce a continuous improvement cycle for both the local and regional work; in contrast, the current situation, with the OEIB’s lack of a data system, is problematic. The RACs are asking for feedback on their proposed metrics and proposed activities and the OEIB cannot give technical assistance with respect to which metrics are most important to measure and which activities are likely to show the largest effect size. This kind of direction requires OEIB policy analysis of longitudinal achievement data.

Table 2: Problem and Opportunity Analysis: Local and Regional Achievement Compacts

Problem Definition	Opportunity with OEIB State Longitudinal Database System	Benefit to OEIB and Schools
Achievement Compact Tracking and Reporting: The OEIB currently has no data system to hold the goals set in Education Compacts by every public school district, college, and university in Oregon, no system to compare and analyze these data, and no system to report compact information to stakeholders.	The OEIB SLDS will allow for easy collection, analysis, and reporting of compact data.	The benefit is clarity and transparency of the compact data to the wide variety of stakeholders involved in creating and reviewing the work of the achievement compacts. This proposed system would reduce workload in schools and districts and promote interest in the OEIB processes.
Analysis of the Efficacy of Achievement Compacts: The compacts from the local and regional groups across the state focus on limited goals and data points. For instance, one of the required elements is the percentage of students reading fluently by third grade, but there is no reported measure for 2nd or 4th grades. The OEIB has no data system to compare compact data with other related data (e.g. from ODE).	The OEIB SLDS will allow comparison and correlation analysis between the compacts' goals and data and other data that is more granular and spans a greater scope of ages/grades.	The original Achievement Compact goals were informed by data, but they were not developed using a rigorous process. The Data System will enable the application of modeling approaches (e.g. structural equal modeling (SEM)) to the factors of interest in the educational continuum. This can be used to refine and improve the goals for the Achievement Compacts.
Support for Continuous Improvement at the Local and Regional Level: Compacts are currently reporting their goals and data on a yearly basis. The is required in statute to give feedback on institutions goal setting and progress over time with respect to the goal of reaching 40/40/20 goals by 2025. This feedback would be used to recommend better goals in future years. The OEIB has no data system to track the longitudinal development of these compacts and the resultant institutional performance.	The OEIB SLDS will contain longitudinal information about districts, colleges, and universities that tracks their Achievement Compact goals, outcomes towards those goals, correlations of those goals and outcomes to other measures. It will also allow for tracking of the compacts over time.	The Achievement Compacts, both at the local and the regional levels, are a new experiment in Oregon. The establishment of the Data System that tracks and reports these efforts, their relation to other performance measures, and their efficacy over time, will help substantiate the statewide effort of thousands of stakeholders.

Institutional Communication and Coordination

Effective program coordination within the public education system is inhibited by technical and governance barriers to data sharing that exist across educational sectors. These barriers include a limited electronic student record exchange system (OSTX), disparate paradigms for and definitions of data, and insufficient communications and engagement with stakeholders throughout the system (especially with respect to communicating effectively with students at risk of failure and/or students who belong to demographic groups that do not perform as well as students from the dominant culture).

These barriers increase staff workload, lead to duplication of effort, inhibit effective program placement and support services, create shadow-systems of informal information exchange, increase data errors, and generally lead to increases in achievement gaps.

Table 3: Problem and Opportunity Analysis: Institutional Communication and Collaboration

Problem Definition	Opportunity with OEIB State Longitudinal Database System	Benefit to OEIB and Schools
Increased staff Workload and Duplication of Effort: The absence of a universal method of electronically transferring critical student records requires school staff to manually enter information. This problem includes enrollment, achievement, and behavioral information.	A standard electronic record format that is honored throughout the P-20 system.	School staff will be able to devote valuable time to other important activities.
Ineffective Program Placement and Support Services: Students require differential support depending on their educational needs. When critical data is not easily transferred with the student, schools potentially misplace a student.	A record format that has program placement information (IEP, ELL, TAG, etc.) as well as diagnostic information on a student's progress towards academic and behavioral standards and the interventions the student has received.	Programs between and among schools can be more aligned. Students who receive special services will have a shorter break in their program of services.
Shadow Systems of Informal Information Exchange: On an ad-hoc basis, staff members share information between schools or agencies in spite of a lack of clear data sharing agreements or policies. This policy breaking happens because it is judged on the ground to be in the interests of the child.	Sharing and governance agreements/procedures with schools/agencies. Uniform data exchange.	Remove the shadow systems of information exchange and codifying practices of inter-agency data sharing will provide more effective services for every student.
Increased Data Errors: The lack of a universal data exchange and common student ID across institutions and agencies can lead to duplicate records and other errors.	The OEIB SLDS would create a universal student record and identity management protocol, building on what already exists at the Oregon Department of Education. This, along with electronic transmission, would reduce duplicates.	More accurate longitudinal systems can be created that track students from P-20W
Increased Opportunity Gaps: Many of the problems above are more perilous for certain groups of students. Students in poverty are move likely to move school to school, increasing the chance that their data is incorrect or they are not expediently placed in the right program. Also, the ad-hoc sharing of information is not done in an equitable manner; pre-existing social contacts help certain families benefit disproportionally.	Data would be more consistently available and informative for staff and less subject to student transitions. All students would benefit from staff that has cross-agency knowledge.	Increasing the consistency, fairness, and equity of the educational system.

Personal Achievement Record (PAR)

Students and parents do not have ready access to their full educational record. Schools are required to maintain a minimum set of information and generally do not have the resources to archive evidence of achievement; they generally record and maintain summary information only (grades and comments). Research shows that students graduate at a higher rate and get better grades when they have access to a more complete educational record and when they can use achievement data and career planning tools to set goals.

As evidenced by a large body of existing independent work on electronic portfolios and digital lockers in schools across the state, schools and districts have recognized the potential of an interactive electronic record for students. In addition, the 2012 and 2013 applications for the Federal Race to the Top grants from a number of the largest districts in the Oregon included a provision for a data and planning tool for students to help them meet College and Career readiness standards. Currently in Oregon, there are two systems in use in some high schools that provide much of this functionality.

Table 4: Problem and Opportunity Analysis: Student Centered Electronic Portfolio

Problem Definition	Opportunity with OEIB State Longitudinal Database System	Benefit to OEIB and Schools
Personal Achievement Record (PAR): Students and families have access to a limited official student record and a collection of graded work from classes. There is no structure or organization for all this information and it is not easily accessible for students or families.	The proposed OEIB Data System would be populated by institutions in a standard method and accessible for individual students and families. The record would be a super-set of the traditional educational record.	Students and families benefit when they have rich information about student achievement and educational attainment. In addition, the focus on student accessible data and student empowerment is a balance to the rest of the data system work, which is focused on institutional and agency goals and objectives.
Goal Setting: Data systems that allow students to reflect on their achievements, set goals, and then monitor their progress improve student achievement. Tools to meet this need already exist in Oregon, but they are not universally available to all students.	The proposed System will contain a planning tool that connects future goals to present work for students. Statewide educational goals have been created that identify final educational outcomes (4-year college graduation, community college completion, and career readiness). However, these goals are often not meaningful to younger students are not connected to K-12.	One cause of the achievement gap between white upper and middle class students and other identified populations is the disparity in the amount of access to information about college and careers. This tool will help level the playing field between for students who will be the first in their family to attend college.
Documenting and Sharing of Achievements: Students earn accomplishments that are not reflected in whole or part by grades (e.g. internships, volunteer experiences, and self-directed learning). In Oregon, there are initiatives across institutions to give credit for proficiencies and credit for prior learning. Currently, there is no system for students to capture their proficiencies and prior learning and no way to systematically share this information with educational institutions or employers.	The proposed System will be developed in coordination with K-12, higher education, and business partners to establish a standard that allows students and institutions to track and share these achievements over time.	Having a statewide standard for all students that extends throughout the P-20 system will represent workload relief to institutions. Also, the standardization will make it easier to for schools and employers to understand and accept the evidence presented.

Alternatives Analysis

This section summarizes the alternatives analysis conducted by RNR Consultants, Inc.

Solution Requirements

Solution requirements were developed through interviews with stakeholders and research into the types of outcome measures that are required for the legislature, the OEIB, HECC, ODE, and other state agencies. Stakeholders included school, college, and university staff, students, parents, and other community groups. With respect to the Personal Achievement Record, the project team analyzed existing systems in use in Oregon and across the country that contain some/most of the required functionality. The detailed requirements are listed in Appendix 5.

Alternatives Identification

In order to identify alternative solutions to meet the problems and provide the opportunities available for an OEIB-SLDS, the project team incorporated input from four major technical sources:

- The National Center for Educational Statistics (NCES), which is the primary federal entity for collecting and analyzing data for education. In particular, the NCES publication "Centralized vs. Federated. Approaches to P-20W Data Systems" was used to provide definitional language, functional distinctions, and benefits and risks of these two approaches to educational longitudinal data systems.
- The Statewide Longitudinal Data Systems Grant Program, which provides Educational SLDS grant information from every state. These grants are funded across the country through the American Recovery and Reinvestment Act (ARRA). The project team reviewed the grant applications from every state and used that information to further define alternative approaches currently in place or in the pipeline.
- Project ALDER, which is the Oregon SLDS funded by ARRA. In particular, the project team met with the ALDER Executive Committee (AEC) to discuss alternative solutions. The AEC has representatives from all major educational data owners in Oregon.
- Staff members from local educational authorities who currently own data warehouses, including K-12 districts, K-12 Regional Data Warehouses, Community College and Workforce Development, and the Oregon University System. In addition, because of the upcoming changes at the university level, the project team also met with staff from the University of Oregon (which will not be part of OUS next year).

In addition, in order to identify alternatives based on political or other non-technical concerns, the project team incorporated input from a variety of sources:

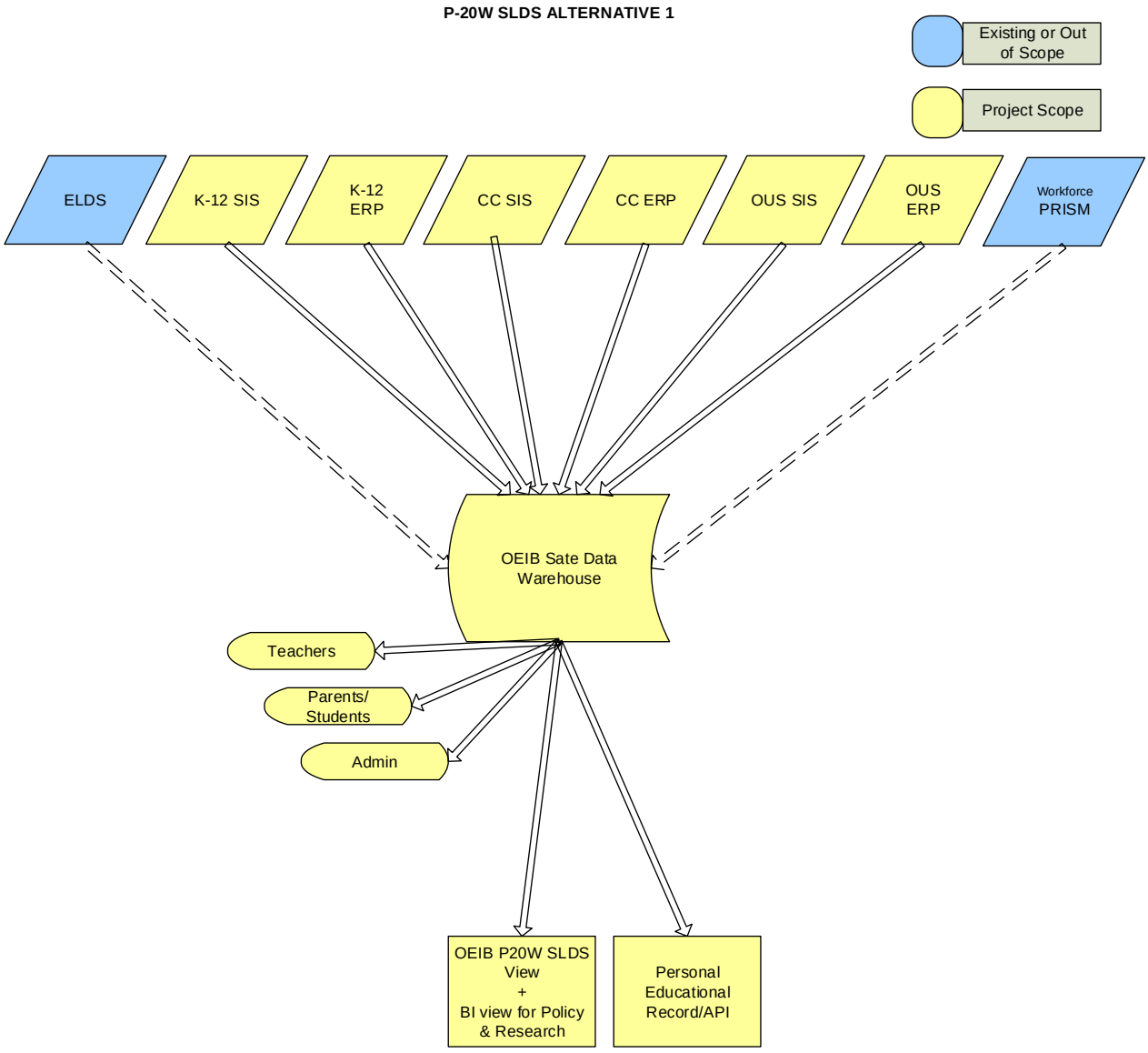
- The Governor and his staff
- Legislators from the Ways and Means Education Sub-committee as well as others who have an expressed interest in this project
- The Oregon Education Investment Board and Outcomes and Investments sub-committee
- The P-20 Cabinet, which includes all OEIB policy staff as well as the leaders of ODE, CCWD, OUS, HECC, SAC, ELC, and YDC.

Overview of Alternatives Analyzed

Alternative 1: *New School Information System (SIS) and Enterprise Resource Planning (ERP) systems for all three sectors and OEIB State DW, User portals, Policy/Research BI solution, Personal Achievement Record (PAR)*.

Assumptions

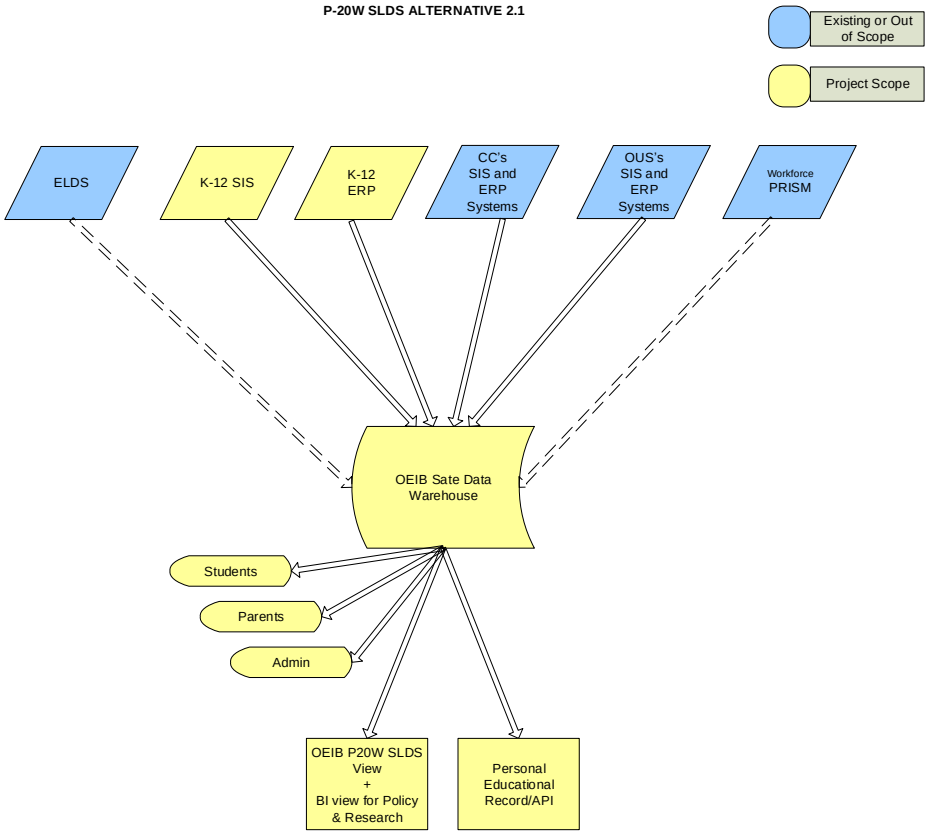
- Three new single source student information systems will be implemented for each of the sectors, K-12, Community Colleges (CC), and Oregon University System (OUS).
- Three new single source ERP systems will be implemented for each of the sectors, K-12, Community Colleges (CC), and Oregon University System (OUS).
- A new OEIB State Data Warehouse will be implemented where SIS and ERP source systems from each sector copy their data to a single, centrally located data repository where they are organized, integrated, and stored using a common data standard.
- In addition, the Early Learning Data System* (ELDS), and the Oregon Workforce Reporting System (PRISM) will integrate with the new OEIB SDW as independent data sources.
- The DW via portals and tools will provide user based access and reports to teachers, parents, institutional administrators, educators, researchers, and policy makers including the P-20W longitudinal record for OEIB and Personal Achievement Record (PAR) for students and parents.


P-20W SLDS ALTERNATIVE 1
Existing or Out of Scope
Project Scope
ELDS
K-12 SIS
K-12 ERP
CC SIS
CC ERP
OUS SIS
OUS ERP
Workforce PRISM
OEIB Sate Data Warehouse
Teachers
Parents/ Students
Admin
OEIB P20W SLDS View + BI view for Policy & Research
Personal Educational Record/API

Alternative 2.1: *New K-12 SIS & ERP systems and OEIB State DW, User portals, Policy/Research BI solution, PAR*.

Assumptions

- Alternative 2.1 takes into account a new single source K-12 SIS and a K-12 ERP system at the operational systems level.
- All other operational systems including SIS and ERP data for CC's and Universities remain the same. There are 17 community colleges, and 7 universities which uses multiple systems and platforms in the state.
- A new OEIB State Data Warehouse will be implemented, where the K-12 common SIS and the ERP along with other participating data sources (K-12 ERP systems, CC and OUS SIS and ERP systems) copy their data to a single, centrally-located data repository where they are organized, integrated, and stored using a common data standard.
- In addition, the Early Learning Data System (ELDS), and the Oregon Workforce Reporting System (PRISM) will integrate with the new OEIB SDW as independent data sources.
- The DW via portals and tools will provide user based access and reports to teachers, parents, institutional administrators, educators, researchers, and policy makers including the P-20W longitudinal record for OEIB and Personal Achievement Record (PAR) for students and parents.



Alternative 2.2: *New K-12 SIS & ERP systems and OEIB State DW, User portals, Policy/Research BI solution, PAR.*

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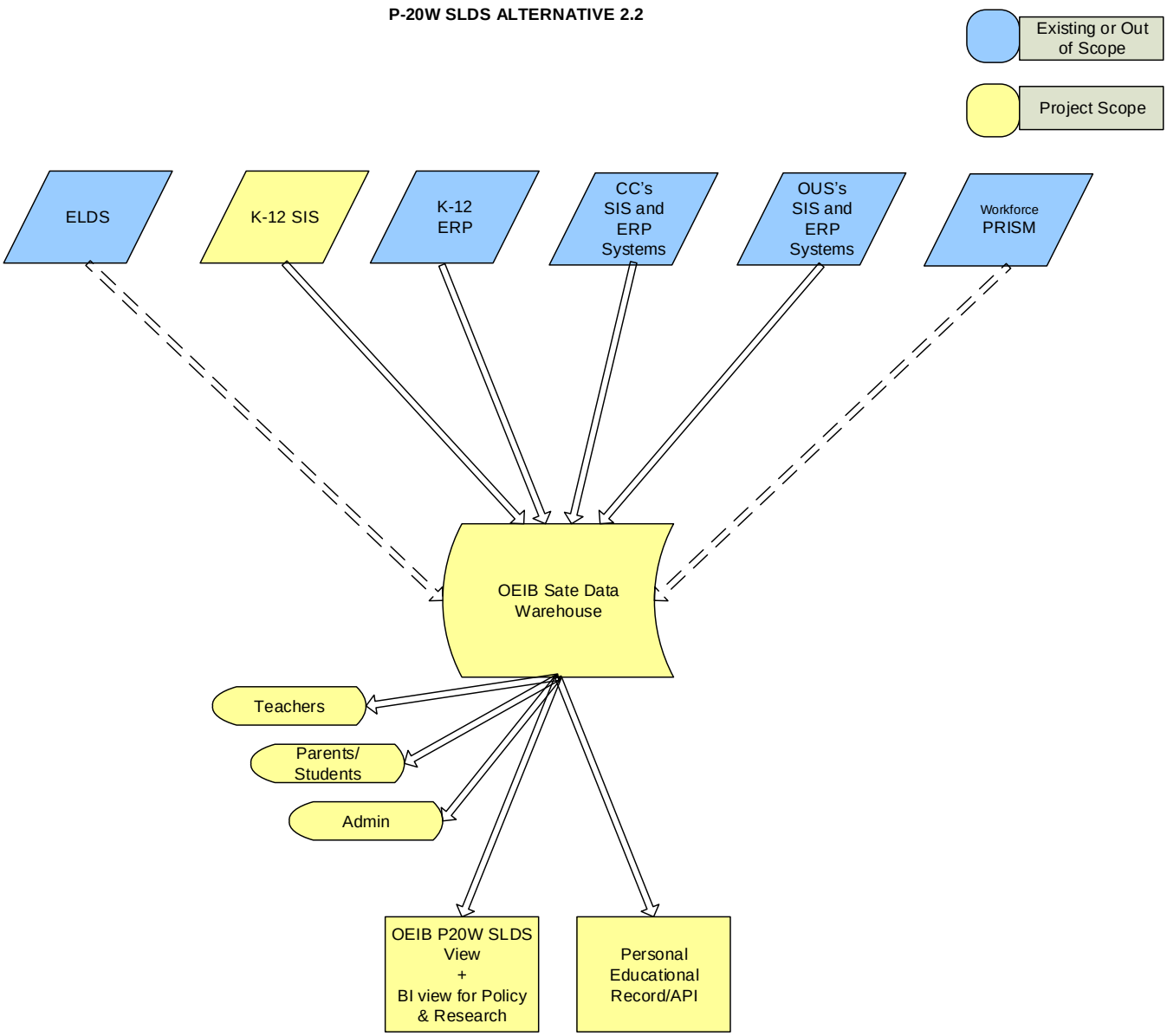
Assumptions

- Alternative 2.2 takes into account a new single source K-12 SIS at the operational systems level.
- All other operational systems including ERP Systems for K-12 Sector, SIS and ERP systems for CC's and Universities remain the same. There are approximately 196 K-12 school districts, 17 community colleges, and 7 universities which uses multiple systems and platforms in the state.
- A new OEIB State Data Warehouse will be implemented, where the K-12 common SIS along with other participating data sources (K-12 ERP systems, CC and OUS SIS and ERP systems) copy their data to a single, centrally-located data repository where they are organized, integrated, and stored using a common data standard.
- In addition, the Early Learning Data System (ELDS), and the Oregon Workforce Reporting System (PRISM) will integrate with the new OEIB SDW as independent data sources.
- The DW via portals and tools will provide user based access and reports to teachers, parents, institutional administrators, educators, researchers, and policy makers including the P-20W longitudinal record for OEIB and Personal Achievement Record (PAR) for students and parents.

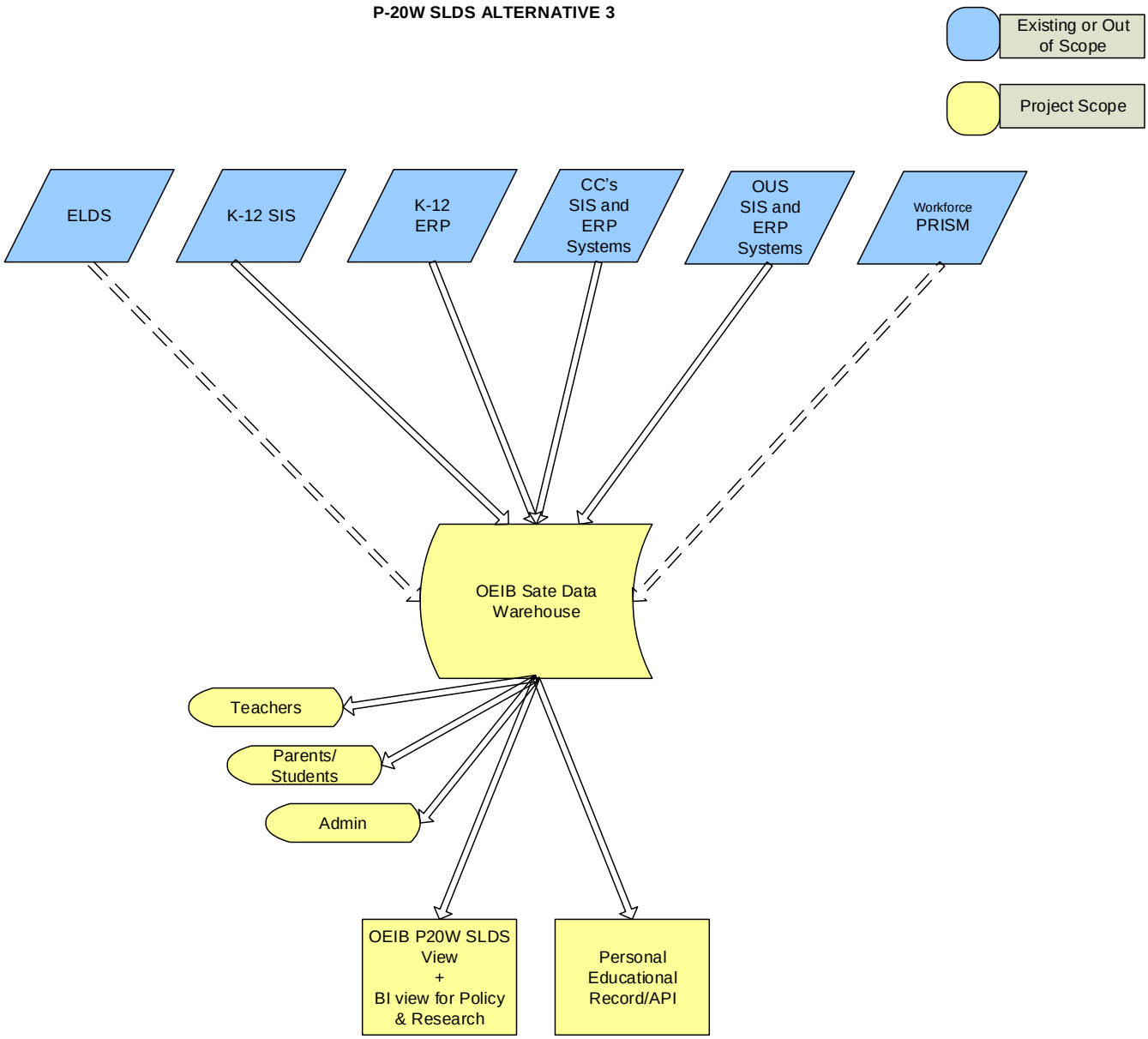


Alternative 3: *New OEIB State DW, User portals, Policy/Research BI solution, PAR.*

Assumptions

- Alternative 3 does not account for any changes at the transactional systems level.
- Existing intuitional/district level SIS and ERP systems will integrate and feed their data into a single, centrally-located data repository (new OEIB SDW), where the data is organized, integrated, and stored using a common data standard.
- In addition, the Early Learning Data System (ELDS), and the Oregon Workforce Reporting System (PRISM) will integrate with the new OEIB SDW as independent data sources to generate longitudinal records.

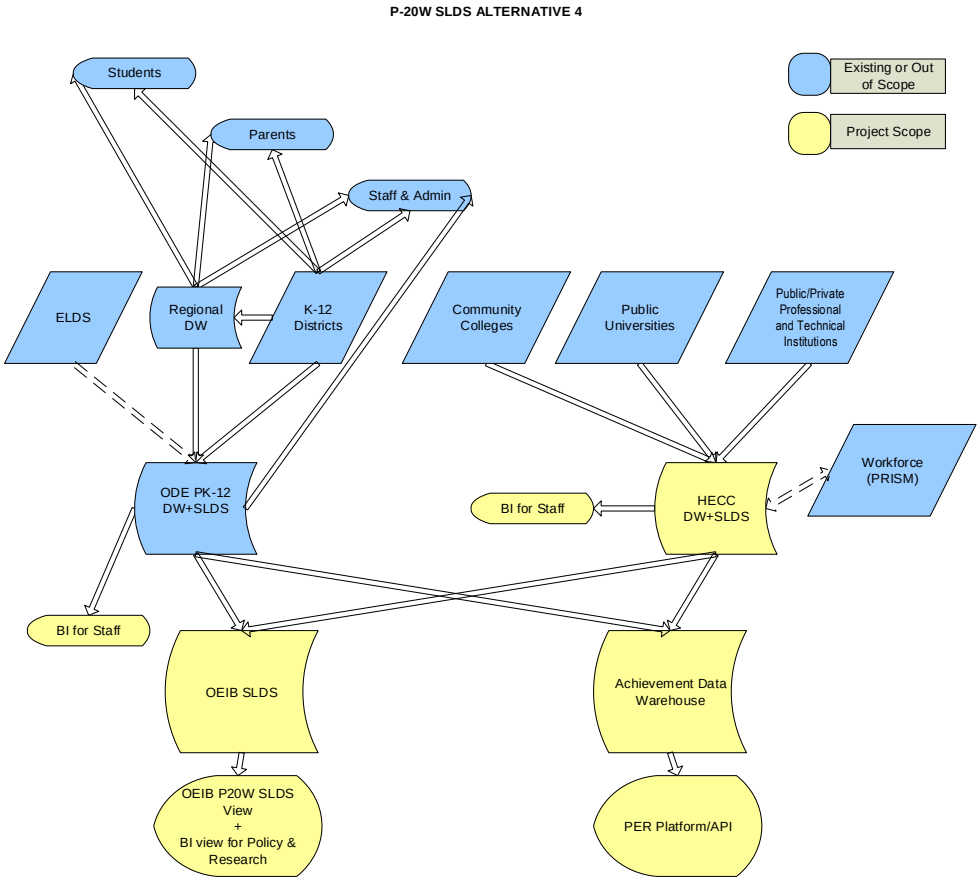
- In addition, the new OEIB State Data Warehouse via portals and tools will provide secured, user-based access, and reports to teachers, parents, institutional administrators, educators, researchers, and policy makers including a Personal Achievement Record (PAR) for students and parents.



Alternative 4: *New HECC DW, Interagency matching, Agency and Policy/Research BI solutions, PAR.*

Assumptions

- Alternative 4 does not account for any changes at the operational systems level.
- Alternative 4 utilizes the existing ODE PK-12 DW, assuming that the DW has the ability to provide PK-12 longitudinal data at the time of the implementation. It also provides a new Business Intelligence solution for the ODE to be consumed by agency and district staff.
- A new HECC Data Warehouse will be implemented, where SIS and ERP source systems from 17 community colleges and 7 public universities will copy their data to a single, centrally-located data repository where they are organized, integrated, and stored using a common data standard. HECC DW will also provide BI capabilities for higher education staff members.
- The Oregon Workforce Reporting System (PRISM) will integrate with the new HECC DW as an independent data source to generate 13-W longitudinal records.
- Longitudinal data from ODE and HECC data warehouses will be identified, matched and linked to create P-20W records through a secure matching engine at the OEIB level. The data will subsequently be anonymized to present the de-identified P20-W Intelligent view for OEIB and policy makers.
- A new Achievement Data Warehouse will be implemented to capture student achievement data. This DW will integrate with the existing ODE DW which contains PK-12 data and the new HECC DW which contains post-secondary data, and provide a view for Personal Achievement Record (PAR) for students and parents.

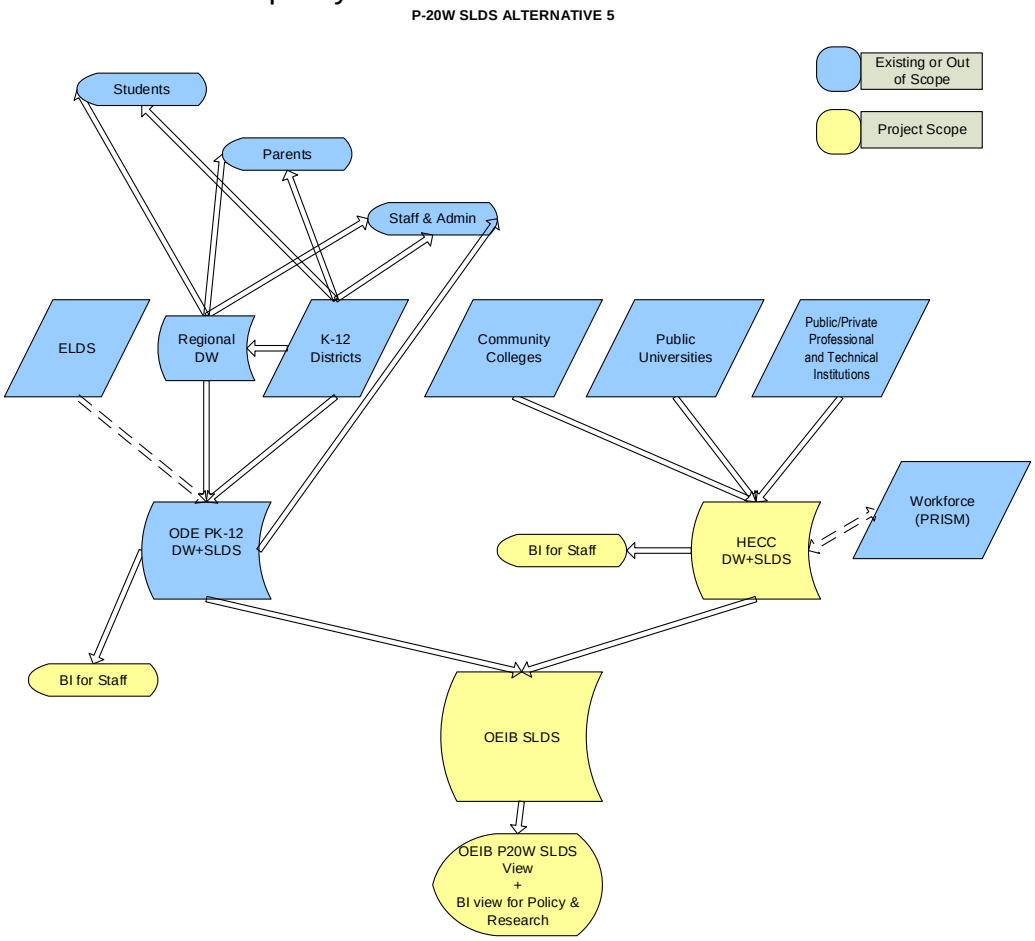


Alternative 5: *New HECC DW, Interagency matching, Agency and Policy/Research BI solutions.*

Assumptions

- Alternative 5 does not account for any changes at the operational systems level.
- Alternative 5 does not create an Achievement Data Warehouse and associated Personal Achievement Record to students to access personal longitudinal data.
- Alternative 5 utilizes the existing ODE PK-12 DW, assuming that the DW has the ability to provide PK-12 longitudinal data at the time of the implementation. It also provides a new Business Intelligence solution for the ODE to be consumed by agency and district staff.
- A new HECC Data Warehouse will be implemented, where SIS and ERP source systems from 17 community colleges and 7 public universities will copy their data to a single, centrally-located data repository where they are organized, integrated, and stored using a common data standard. HECC DW will also provide BI capabilities for higher education staff members.
- The Oregon Workforce Reporting System (PRISM) will integrate with the new HECC DW as an independent data source to generate 13-W longitudinal records.

- Longitudinal data from ODE and HECC data warehouses will be identified, matched and linked to create P-20W records through a secure matching engine at the OEIB level. The data will subsequently be anonymized to present the de-identified P20-W Intelligent view for OEIB and policy makers.



Alternative 6: *Do nothing.*

Assumptions

- Alternative 6 assumes that the choice to do nothing to any existing system beyond the projects that are currently underway.
- Alternative 6 does not account for any changes at the operational systems level.
- Alternative 6 does not support HECC agency data warehouses and longitudinal databases.
- Alternative 6 does not provide BI capabilities for legislators and other policy makers, K-12 or higher education staff.
- Alternative 6 does not create an Achievement Data Warehouse and associated Personal Achievement Record to students to access personal longitudinal data

Selection Criteria and Weighting

The purpose of this section is to introduce and use a set of criteria that will enable evaluation of the proposed alternative solutions for Oregon's P-20W SLDS Project. This evaluation criteria is designed in order to allow OEIB to:

- Evaluate and compare proposed alternative solutions;
- Utilized as a score card in order to rank alternatives:
- Identify and select the alternative that is most-optimally-suited for further analysis.

The selected criteria and relative weights are:

Evaluation Criteria			
#	Item	Description	Weighed Score
1.	Alignment with OEIB goals & functionality.	Evaluation of a proposed alternative's degree of alignment with OEIB's goals	30%
2.	Costs	An evaluation of the estimated initital investment to develop each alternative and the on-going operational costs. Refer to the cost assessment for estimated TCO for each alternative.	15%
3.	Risk exposure	An evaluation rgarding the organizational/business, technical, and project risks associated with each alternative.	25%
4	Security	Evaluate the privacy and potential data security issues for each alternative.	20%
5	Future Opportunities	Evaluate the future opportunities that may be presented by each alternative.	10%

Alternatives Analysis by Criteria

Costs

The following section summarizes the estimated costs associated with each alternative analyzed in this business case for the SLDS-P20W project. Total cost of effort for each alternative is based on the cost assumptions and high-level designs outlined, for a five (5) year period were assessed by RNR Consulting based on the discussions with project sponsors, vendors, and other subject matter experts (SMEs). Please refer to the Appendix 3 for a detailed cost assessment and Appendix 4 for detailed cost assumptions.

The following five cost categories were identified and assessed to estimate costs associated with each alternative:
1. Hardware Costs (Hardware Purchase, Configuration and Deployment)

2. Software Cost (One time application license costs and recurring fees for maintenance and support for five years)
3. Implementation Service Cost (Requirement definition, system design, development and testing costs, ETL design and development, system integration, and report development)
4. Other costs (user-training cost, independent project management and quality assurance costs, and internal staffing costs[1])
5. Contingency Costs

The following table summarizes the total cost associated with each alternative for a period of five years:

Table 5: Estimated Total Cost by Alternative

Alternative	Estimated Total Costs ($)
Alternative 1 *(New SIS & ERP systems for all three sectors and OEIB State DW, User portals, Policy/Research BI solution, PAR)*	91,907,949
Alternative 2.1 *(New K-12 SIS & ERP systems and OEIB State DW, User portals, Policy/Research BI solution, PAR)*	$54,103,575
Alternative 2.2 *(New K-12 SIS and OEIB State DW, User portals, Policy/Research BI solution, PAR)*	$38,247,110
Alternative 3 *(New OEIB State DW, User portals, Policy/Research BI solution, PAR)*	$11,147,961
Alternative 4 *(New HECC DW, Interagency matching, Agency and Policy/Research BI solutions, PAR)*	$8,595,102
Alternative 5 *(New HECC DW, Interagency matching, Agency and Policy/Research BI solutions)*	$6,144,546

Please refer to the following section for a breakdown of estimated total costs for each alternative:

Critical assumptions (as applicable) for Alternative 1-3 cost estimation exclude the following costs:
(1) Labor cost associated with instuitional resource requirements to support project/training needs at the local level, and (2) Cost associated with enterprise storage impact (infrastructure and physical space) as the OEIB DW matures over time.

Other key assumptions include:
ERP software cost is limited to basic financial and HR modules to support minimum requirements. Training cost is limited to train minimum staff members using the train-the-trainer approach. Substantial amount of training costs may be associated with training all necessary end-users and IT support staff at the local level. An important assumption in determinining software costs is that existing institutional database licenses will offset the cost of purchasing new licenses. A placeholder of $200K has been included towards standard license fees for additional users.

Table 6: Alternative 1 – Estimated Cost Breakdown

Cost Categories & Sub Categories	Total Estimated Cost
Hardware Costs	
Total Hardware Purchase, Config and Deployment	$ 5,055,889
Total Hardware Costs	$ 5,055,889
Software costs	
Total Application License Cost	$ 16,489,627
Total Application Integration License Costs	$ 281,523
Total Database License Costs	$ 200,000
Total Application License Maintenance and Support Cost	$ 26,417,503
Total Software Cost	$ 43,388,753
Implementation Costs	
Total Requirements, Process & Workflow Analysis Costs	$ 2,647,500
Total System Design, Development and Testing Costs	$ 13,417,519
Total ETL Design, Development & Testing	$ 847,400
Total System Integration Costs	$ 135,000
Total Cost for Report Development	$ 1,171,500
Total Implementation Costs	$ 18,218,919
Other Costs	
Total Training Costs	$ 5,308,704
Total State IT Resources	$ 3,729,582
Total Project Management Cost	$ 3,529,143
Total Other Costs	$ 12,567,429
Total Software, Hardware, Implementation, and Other Costs	**$ 79,230,990**
Contingency Cost (10%)	**$ 7,923,099**
Total Quality Assurance Cost (6%)	**$ 4,753,859**
Total Estimated Project Costs	**$ 91,907,949**

Table 6 listed above is a breakdown of estimated project costs associated with Alternative 1 into the constituent categories and subcategories.

Table 7: Alternative 2.1 Estimated Cost Breakdown

Cost Categories & Sub Categories		Total Estimated Cost
Hardware Costs		
Total Hardware Purchase, Config and Deployment	$	3,509,813
Total Hardware Costs	$	3,509,813
Software costs		
Total Application License Cost	$	28,346,860
Total Application Integration License Costs	$	911,922
Total Database License Costs	$	420,000
Total Application License Maintenance and Support Cost	$	18,092,262
Total Software Cost	$	29,678,782
Implementation Costs		
Total Requirements, Process & Workflow Analysis Costs	$	1,441,100
Total System Design, Development and Testing Costs	$	2,594,210
Total ETL Design, Development & Testing	$	255,400
Total System Integration Costs	$	540,000
Total Cost for Report Development	$	571,500
Total Implementation Costs	$	5,402,210
Other Costs		
Total Training Costs	$	3,052,430
Total State IT Resources	$	3,729,582
Total Project Management Cost	$	1,268,196
Total Other Costs	$	8,050,208
Total Software, Hardware, Implementation, and Other Costs	$	46,641,013
Contingency Cost (10%)	$	4,664,101
Total Quality Assurance Cost (6%)	$	2,798,461
Total Estimated Project Costs	$	54,103,575

Table 7 listed above is a breakdown of estimated project costs associated with Alternative 2.1 into the constituent categories and subcategories.

Table 8: Alternative 2.2 - Estimated Cost Breakdown

Cost Categories & Sub Categories		Total Estimated Cost
Hardware Costs		
Total Hardware Purchase, Config and Deployment	$	2,259,813
Total Hardware Costs	$	2,259,813
Software costs		
Total Application License Cost	$	6,976,068
Total Application Integration License Costs	$	365,348
Total Database License Costs	$	200,000
Total Application License Maintenance and Support Cost	$	13,366,651
Total Software Cost	$	20,908,067
Implementation Costs		
Total Requirements, Process & Workflow Analysis Costs	$	311,700
Total System Design, Development and Testing Costs	$	1,692,268
Total ETL Design, Development & Testing	$	145,400
Total System Integration Costs	$	337,500
Total Cost for Report Development	$	1,101,500
Total Implementation Costs	$	3,588,368
Other Costs		
Total Training Costs	$	1,693,531
Total State IT Resources	$	3,729,582
Project Management Costs	$	792,285
Total Other Costs	$	6,215,398
Total Software, Hardware, Implementation, Other Costs	$	32,971,646
Contingency Cost (10%)	$	3,297,165
Total Quality Assurance Cost (6%)	$	1,978,299
Total Estimated Project Costs	$	38,247,110

Table 8 listed above is a breakdown of estimated project costs associated with Alternative 2.2 into the constituent categories and subcategories

Table 9: Alternative 3: Estimated Cost Breakdown

Cost Categories & Sub Categories	Total Estimated Cost
Hardware Costs	
Total Hardware Purchase, Config and Deployment	$ 315,000
Total Hardware Costs	$ 315,000
Software costs	
Total Application License Cost	$ 167,183
Total Application Integration License Costs	$ 603,348
Total Database License Costs	$ 200,000
Total Application License Maintenance and Support Cost	$ 797,898
Total Software Cost	$ 1,768,429
Implementation Costs	
Total Requirements, Process & Workflow Analysis Costs	$ 759,870
Total System Design, Development and Testing Costs	$ 452,170
Total ETL Design, Development & Testing	$ 796,500
Total System Integration Costs	$ 324,000
Total Cost for Report Development	$ 121,500
Total Implementation Costs	$ 2,454,040
Other Costs	
Training & Training Materials	
Total Training Costs	$ 847,960
Total State IT Resources	$ 3,729,582
Project Management Costs	$ 495,300
Total Other Costs	$ 5,072,842
Total Software, Hardware, Implementation, and Other Costs	$ 9,610,311
Contingency Cost (10%)	$ 961,031
Total Quality Assurance Cost (6%)	$ 576,619
Total Estimated Project Costs	$ 11,147,961

Table 9 listed above is a breakdown of estimated project costs associated with Alternative 3 into the constituent categories and subcategories.

Critical assumptions (as applicable) for Alternative 4 & 5 cost estimation include: (1) That the HECC will conform and merge the CC, OUS and other secondary institution data satisfactorily outside the scope of this project, (2) That the Regional K-12 DW will be conformed and scope of data expanded outside the scope of this project, (3) The scope of data for PAR is not clearly defined during the development of this business case, and a RESTful webservice is the best mechanism for integration of PAR data with other applications, and (4) Labor cost related to instuitional staffing requirements to support project needs (data quality checkpoints, review and approve query requests, etc.) is not included in this cost assessment.
The following tables outline the summaries of estimated costs associated with Alternative 4 and 5.

Table 10: Alternative 4- Estimated Cost Breakdown

Cost Categories & Sub Categories	Total Estimated Cost
Hardware Costs	
Total Hardware Purchase, Config and Deployment	$ 522,000
Total Hardware Costs	$ 522,000
Software costs	
Total Application License Cost	$ 381,000
Total Application Integration License Costs	$ 37,450
Total Database License Costs	$ 200,000
Total Application License Maintenance and Support Cost	$ 346,838
Total Software Cost	$ 965,288
Implementation Costs	
Total Requirements, Process & Workflow Analysis Costs	$ 557,000
Total System Design, Development and Testing Costs	$ 387,270
Total ETL Design, Development & Testing	$ 931,500
Total System Integration Costs	$ 216,000
Total Cost for Report Development	$ 120,000
Total Implementation Costs	$ 2,211,770
Other Costs	
Total Training Costs	$ 1,027,600
Total State IT Resources	$ 2,197,008
Project Management Costs	$ 485,906
Total Other Costs	$ 3,710,514
Total Software, Hardware, Implementation, and Other Costs	$ 7,409,571
Contingency Cost (10%)	$ 740,957
Total Quality Assurance Cost (6%)	$ 444,574
Total Estimated Project Costs	$ 8,595,102

Table 10 listed above is a breakdown of estimated project costs associated with Alternative 4 into the constituent categories and subcategories.

Table 11: Alternative 5 - Estimated Cost Breakdown

Cost Categories & Sub Categories	Total Estimated Cost
Hardware Costs	
Total Hardware Purchase, Config and Deployment	$ 454,000
Total Hardware Costs	$ 454,000
Software costs	
Total Application License Cost	$ 423,683
Total Application Integration License Costs	$ 37,450
Total Database License Costs	$ 200,000
Total Application License Maintenance and Support Cost	$ 584,806
Total Software Cost	$ 1,007,214
Implementation Costs	
Total Requirements, Process & Workflow Analysis Costs	$ 170,700
Total System Design, Development and Testing Costs	$ 607,500
Total ETL Design, Development & Testing	$ 359,380
Total System Integration Costs	$ 111,240
Total Cost for Report Development	$ 120,000
Total Implementation Costs	$ 1,368,820
Other Costs	
Total Training Costs	$ 214,600
Total State IT Resources	$ 2,014,875
Project Management Costs	$ 237,513
Total Other Costs	$ 2,466,988
Total Software, Hardware, Implementation, and Other Costs	$ 5,297,022
Contingency Cost (10%)	$ 529,702
Total Quality Assurance Cost (6%)	$ 317,821
Total Estimated Project Costs	$ 6,144,546

Table 11 listed above is a breakdown of estimated project costs associated with Alternative 5 into the constituent categories and subcategories.

Table 12: Estimated Cost for Replacing Transactional Systems

Transcational System by Educational Sector	Alternative 1	Alternative 2.1	Alternative 2.2	Alternative 3	Alternative 4	Alternative 5
K-12 SIS	$ 23,995,445	$ 24,073,145	$ 24,803,145	$ -	$ -	$ -
K-12 ERP	$ 12,762,194	$ 13,020,693	$ -	$ -	$ -	$ -
CC SIS	$ 8,431,092	$ -	$ -	$ -	$ -	$ -
CC ERP	$ 9,080,696	$ -	$ -	$ -	$ -	$ -
UNIV SIS	$ 6,604,340	$ -	$ -	$ -	$ -	$ -
UNIV ERP	$ 7,093,158	$ -	$ -	$ -	$ -	$ -

The following table is a comparison of total costs and sub-catogories for each alternative.

Table 13: Summary of Total Estimated Cost by Alternative

Cost Categories	Alternative 1	Alternative 2.1	Alternative 2.2	Alternative 3	Alternative 4	Alternative 5
Total Hardware Costs	$ 5,055,889	$ 3,509,813	$ 2,259,813	$ 315,000	$ 522,000	$ 454,000
Total Software Cost	$ 43,388,753	$ 29,678,782	$ 20,908,067	$ 1,768,429	$ 965,288	$ 1,007,214
Total Implementation Costs	$ 18,218,919	$ 5,402,210	$ 3,588,368	$ 2,454,040	$ 2,211,770	$ 1,368,820
Total Other Costs	$ 12,567,429	$ 8,050,208	$ 6,215,398	$ 5,072,842	$ 3,710,514	$ 2,466,988
Contingency Cost (10%)	$ 7,923,099	$ 4,664,101	$ 3,297,165	$ 961,031	$ 740,957	$ 529,702
Total Quality Assurance Cost (6%)	$ 4,753,859	$ 2,798,461	$ 1,978,299	$ 576,619	$ 444,574	$ 317,821
Total Estimated Project Costs	$ 91,907,949	$ 54,103,575	$ 38,247,110	$ 11,147,961	$ 8,595,102	$ 6,144,546

Benefits

Except for Alternative 6 (do nothing), each of the alternatives will provide benefits in two key areas: (1) the creation of a de-identified longitudinal database for legislators, other policy makers, and research partners and (2) the creation of a Personal Achievement Record for students.

The continuum of current or proposed investments in the P-20W education sector is wide-ranging and accounts for over $10 Billion per year. These investments include the state school funds that pay for K-12 and that support community colleges and private universities. While many of the decisions with respect to this spending are made at the local level, state policy makers define funding formulas, policies, and laws describing how these funds must be spent. If the OEIB-SLDS is able to help hone the funding policies and practices and achieve an increase in efficiency of only 0.1%, the sector would save $10 million per year.

Strategic Investments, proposed by the OEIB, ODE, and HECC are a key mechanism to catalyze local activities and support seamless systems aligned towards state goals. In the 2013-2014 school year, $75 million was allocated in two areas: $45.6 million to create the Network for Quality Teaching and Learning and $29.4 million for strategic initiatives for student

success (early literacy focus, Science Technology Education and Math and Career and Technical Education programs, and creating a college-going culture in Oregon schools). All of these strategic investments should have a state standardized and usable measurement system to support the tracking of the data across levels/sectors; however, at this time, they do not. There will be an opportunity lost if these new investments are not adequately evaluated in terms of the lost learning the OEIB and the state would have with regard to their efficacy and whether they should continue to be funded.

Moving forward, in this more targeted arena, the OEIB-SLDS would be most applicable for policy and expenditure work. Assuming $75 million of targeted funding in the next spending cycle, a 5% improvement in the investments made as a result of data based decision-making would save $3.75 million per year.

Beyond the existing Strategic Invesments, there is current interest on boards, commissions, and among legislative groups to explore new initiatives and/or modify current initiatives. These include the Kindergarten readiness assessments; a focus on third grade reading as a goal from age three; financially supporting dual enrollment in high school; new payment methods or fee structures in post-secondary. All of these possible investments would be better developed if the designers had access Oregon data. For example, at this time as a state, we cannot examine our own historical record of high school students and their class-taking patterns and predict the right number of dual credits we should be looking to guarantee for all students.

The Personal Achievement Record (PAR) will also have a return on investment. This proposed alternative will require processing with educational stakeholders. However, it is designed to match or exceed the functionality of existing software solutions available for students to have access to their own record of achievement and to planning and goal setting tools that span the ages of middle school to career. Research is definitive regarding the positive effect of connecting students to career and college information, helping students develop personalized learning plans that reflect on past achievements and set future goals, and delivering such content to students starting in elementary school. (Appendix 7)

Improvement in educational outcomes returns value to the state in a number of ways. With respect to state economic benefits of different changes in human development outcomes, Timothy Bartik (Early Childhood Programs and Local Economic Development, Appendix 8) reports the following: a change in a student test score by 0.1 accounts for $8312 of economic benefits back to the state; a high school diploma accounts for $175,234; a bachelors degree $375,912. Small changes in any of these indicators statewide as a result of better investments would represent significant return on investment. For example, if the new knowledge and direction for students provided by the PAR increases the graduation rate by 0.5%, the result would be a return of over $40 million for Oregon.

In addition, each alternative has its own particular set of benefits and these are listed below.

Alternative 1

Description: Alternative 1 is a complete replacement of all the elements required to meet all of the requirements of the Oregon Education Investment Board (OEIB) State Longitudinal Database System for P-20W Education (OEIB-SLDS).

Potential Benefits of Alternative 1

Individual student information systems (SIS) and financial and human resource (HR) systems (ERP systems) will be replaced under this alternative thus providing for a completely uniform data environment for all student information and institutional financial and HR information for each sector (K-12, Community Colleges, and Universities) across Oregon. The standardized data environment in Alternative 1, will aid in the ability to perform meaningful analysis and outcome reporting across all school districts and higher education agencies including:

- Increased ability to meet state's and OEIB's changing business requirements;
- Increased ability to account for data integrity/security;
- Increased ability to enforce data governance;
- Increased feasibility in implementing OEIB State Data Warehouse (SDW), Personal Achievement Record (PAR), State Longitudinal Database System (SLDS) and Business Intelligence (BI) tools with common data standard covering all sectors;
- Elimination of redundant and inconsistent data;
- Ease of information sharing among schools, school districts, higher educational institutions, state agencies, etc.;
- Increased ability to provide timely, accurate state-level reporting and progress reports for institutions (peer comparisons, etc.)

Statewide Student Information Systems (SSIS) will provide a statewide single view of the student, thereby reducing duplicate and possibly conflicting student record data. SSIS can provide for more standard comparisons of different educational providers, practices and methods. It will allow for a clearer evaluation of the impact of education on a student and provides for a strong framework for predictive analytics. In addition, SSIS will allow for secure and instant student record transfer from a school, school district, or from a higher education institution level.

Statewide Integrated Enterprise Resource Planning (ERP) system will increase the ability to provide accurate and real time or near-real time financial and personnel data, so the state can optimize its resources and make better-informed decisions for budgeting, fiscal planning, and policy making. The HR module will allow for a standardized view of all employees, across all sectors thus increasing the visibility related to HR functions and reporting. This visibility can aid in the comparison of key areas such as compensation, education and credentials, and employee retention throughout the state. The system will organize personnel and employment data, especially with respect to educator licensing and "highly qualified" status. It will enable tracking of staff, maintaining their professional histories as they enter and progress through teacher preparation programs, receive professional development, and transfer among schools. This new ERP system will also chart budget and accounting spending according to State requirements. It will provide for a balanced approach to Return on Investment (ROI) calculations and analysis for state funded projects, institutional, agency, and/or regional level. Additionally, implementation of a statewide ERP system for all sectors will significantly

increase OEIB's ability to comprehensively track investments across agencies and account for more sensible budget requests. Most importantly, the State can expect potential cost savings significantly, from reducing labor-intensive, paper-based processes, eliminating the need for duplication of efforts related to various financial and human resource functions.

Implementation of Alternative 1 is anticipated to save significant operational costs by:

- Repurposing employee time spent in all school districts, community colleges, and universities in data collection and reporting;
- Repurposing employee time spent in state agencies conducting job functions related to data collection, data quality, data integration and analysis;
- Avoiding maintenance costs associated with individual intuitional/district level systems through centralized system maintenance;
- Avoiding costs associated with replacing existing SIS and HR/financial systems or purchasing/developing additional modules to meet new requirements of the OEIB.

Alternatives 2.1 & 2.2

Description: Alternative 2.1 does not account for any changes to the transactional systems at the institutional level except for the implementation of a new single source SIS and single source ERP for the K-12 sector. All other transactional systems that contain student information, institutional financial and human resource information in all other sectors remain the same. Compared to the Alternative 2.1, Alternative 2.2 accounts for implementing a new single source SIS for K-12, while no changes to the ERP transactional systems at K-12 sector. All other transactional systems including ERP data for K-12 school districts, student information and ERP data for community colleges and universities remain the same. There are 196 K-12 school districts, 17 community colleges, and 7 universities which use multiple systems and platforms to collect student information and ERP data. All other components are similar to Alternative 1

Potential Benefits of Alternative 2.1 & 2.2

Alternative 2.1 will provide similar benefits as Alternative 1 related to the implementation of single source SSIS and ERP system for K-12 sector. Alternative 2.2 will provide similar benefits as Alternative 1 related to implementation of a single source SSIS for K-12 sector. However, the scope of benefits stated under Alternative 1 will be limited, since Alternative 2 restricts statewide integrated SIS and ERP systems to the K-12 sector. However, both alternatives are anticipated to save significant operational costs by;

- Repurposing employee time spent in community colleges and universities in data collection and reporting;
- Repurposing employee time spent in state agencies conducting job functions related to data collection, data quality, data integration and analysis;

- Avoiding maintenance costs associated with individual intuitional/district level systems through centralized system maintenance;
- Avoiding costs associated with replacing existing SIS and HR/financial systems or purchasing/developing additional modules to meet new requirements of the OEIB.

In addition, Alternatives 2.1 and 2.2 will allow for improved collection, analysis, and reporting of achievement compact data through implementation of a common, single source SSIS for k-12 sector. Since the OEIB SDW will contain longitudinal information about districts that track their Achievement Compact goals, outcomes towards those goals, correlation of those goals and outcomes to other measures, both Alternatives will allow for implementing standard processes and policies for data collecting, cleansing and reporting these data needs. Similarly, a statewide ERP system for the K-12 sector will increase the state's ability to track financial information related to school districts in order to account for data-driven decisions for the state's investment. However, benefits related to a single source, statewide ERP system for the K-12 sector will be limited to Alternative 2.1. Replacing transactional systems in the K-12 sector will allow OEIB to reduce cost of implementing and maintaining the data system through:

- Selecting infrastructure to support centralized data warehouse and tools;
- Providing consistency in applying data cleansing processes and data quality checks;
- Elimination of redundant tasks common to every school district such as hardware purchases and installations, database updates, updating security protocols, environment/version/patch upgrades, on-going training of current and new technical staff.

Alternative 3

Description: Alternative 3 does not account for any changes at the transactional systems level. Existing institutional/district level SIS and ERP systems will integrate and feed their data into a single, centrally-located data repository (OEIB SDW), where the data will be organized, integrated, and stored using a common data standard. In addition, the Early Learning Data System (ELDS), and the Oregon Workforce Reporting System (PRISM) will integrate with the new OEIB SDW as independent data sources to generate longitudinal records. In addition, the new OEIB State Data Warehouse via portals and tools will provide secured, user-based access, and reports to teachers, parents, institutional administrators, educators, researchers, and policy makers including a Personal Achievement Record (PAR) for students and parents.

Potential Benefits of Alternative 3

OEIB Data warehouse can result in improved data quality by providing consistent codes and descriptions, flagging and even fixing bad data. In addition, error rates caused by duplicate data will be reduced when moved to the common data model. The centralized data structure will hold the key identifying elements needed for timely and common reporting to meet the needs of educational agencies, educators, researchers, policy makers, students, parents,

community members and other stakeholders. In addition to statewide benefits associated with increasing capabilities in data driven decision making to improve education policies and practices, Alternative 3, will account for following potential benefits:

- Significant operational cost savings from repurposing employee time spent in educational agencies (and research partners) in conducting tasks related to linking data across agencies;
- Significant operational cost savings repurposing employee spent in conducting activities related to data errors and inconsistencies;
- Significant operational cost savings from repurposing employee time spent in institutions, districts, and agencies generating ad hoc reports and responding to various data requests;
- Cost avoidance from having to hire additional employees to conduct tasks related to record linking, generating ad hoc reports to meet OEIB's new requirements.

Alternatives 1-3 discuss implementation of a centralized Data Warehouse, which maintains a copy of the information from the source transaction systems so that congregation of this data from the variant systems into a single database can allow for a query engine to clearly present the student and financial/HR data. Data warehouses are more successful at running large, long running, analysis queries than transaction processing databases as discussed in Alternative 4, and 5. Data warehouses restructure data enabling superior query performance, even for complex analytic queries without impacting the transactional systems.

Alternative 4 & 5

Description: Alternatives 4 & 5 are described as utilizing the existing architecture of the state's educational systems, where data from participating agencies are temporarily linked to create a report or generate a dataset for P-20W data reporting purposes. The primary difference between the two alternatives is that Alternative 4 accounts for creating a Personal Achievement Record (PAR) for students and parents and Alternative 5 does not include the PAR. Alternative 4 & 5 take into account the following components:

Potential Benefits of Alternative 4, and 5

Alternative 4 and 5 provide similar benefits in terms of generating P-20 W longitudinal records at the student level and also provide BI capabilities to answer policy and research questions. Alternative 4 and 5 will also significantly reduce costs and time-lines associated with the acquisition, implementation, and training required by the procurement of new technology systems. In addition, these alternatives will shorten the productivity drag attributable to the adoption of new technologies. However, Alternative 4 also includes additional benefits offered by providing access to a Personal Achievement Record (PAR). The additional benefits provided by the Personal Achievement Record (PAR) fall directly to Oregon students and parents. These records provide students and parents with a means to identify and verify

important educational records including student achievements (grades, proficiency badge data, work samples) and goal setting (interest inventories, career interests, short reflections, etc.).

The Personal Achievement Record (PAR) reduces the amount of time required to gain access to student records by authorized users. If records contain inaccurate or misleading information, the student will be able to more quickly identify and take/request corrective action than if they had to wait to receive access in more traditional access parameters. In addition, the Personal Achievement Record improves the monitoring of student achievement and improved visibility of students to their completed and required courses to achieve academic advancements. Most importantly, Personal Achievement Records (PAR) may provide various non-financial benefits including:

- Ability to motivate student learning and signals student achievements;
- Ability to capture wide variety of students skills, identify new skills and career interests;
- Ability to communicate students' successes, reflections, and may support learning beyond traditional classroom boundaries;
- Ability to provide state verified and a more complete picture of student's achievement for potential employers, and educational institutions and others.

The agency level Business Intelligence solutions included in these alternatives will offer the Oregon education system tremendous benefits in how they can use analytics to drive more efficient delivery of education services. Business intelligence platforms provides capabilities such as reporting, analytics, dashboards, planning and scorecards that help institutions, schools, boards, districts and agencies build an interconnected and intelligent system for managing all aspects of education. These users will be given the capability to find answers OEIB's Achievement Compacts for each sector.
Business Intelligence Systems can provide predictive analytical capabilities that leverage historical data to provide early warnings. Real-time information provided by these systems coupled with the reduction in required resources needed to identify these students helps to overcome inadequacies in paper processes, siloed systems and redundant administrations.

OEIB Business Intelligence solution will be utilized to answer questions for policy makers and also to provide a platform for public and private research partners to analyze state's educational programs and policies. The BI solution will provide for anecdotal evidence and conjecture in order to improve the data-driven decision making/policy making in Oregon. Using real time or near real time data available, users will be able to given high-quality information to make difficult policy, program, and resource allocation decisions. The BI solution could be utilized to find answers for key questions such:

1. What is the average wage earned by students who attend some community college, get an associate's degree, certificate, attend college, complete college, etc.?
2. What is the average wage for different college degrees?
3. What effect do college scholarships have on college and career success?

4. What academic grades are predictive of college and career success? What standardized tests are predictive of college and career success?
5. What patterns can be found between spending in certain categories and differential achievement?
6. What type of assessment is most predictive of student success?
7. What profile of risk factors is dispositive to identify students who need immediate intervention?
8. What are the differential patterns of achievement across levels for different demographic groups (gender, race, SES, native language, disability, etc)?
9. What are the aggregate effects of state strategic investment X on achievement compact measures and 40/40/20?
10. How does school size affect achievement? How does class size affect achievement?

In addition, BI tools can make it easier for end-users to generate meaningful reports without requiring vast IT know-how. This can eliminate the number and backlog of centralized reporting requests through self-service access to required data, decreasing the time required to obtain desired reports. These meaningful reports can facilitate the discovery of non-intuitive relationships and provides for rapid feedback regarding actions taken. The reports generated through the BI tools provide insight and measurement regarding a variety of strategic and tactical efforts undertaken.

Risk Identification

Identification of risks associated with each alternative and its characteristics is a critical step in the alternative analysis process while selecting the best alternative for OEIB's SLDS-P20W Project. For the purposes of this section, a risk is defined as "An uncertain event or condition that, if it occurs, will have a negative or positive effect on one or more project objectives." This definition is consistent with the Project Management Institute's PMBOK® Guide definition of risk. Business/organizational risks, technical risks, and project risks (cost, schedule, scope, quality) associated with each alternative have been identified and documented in the following section.

Alternative 1

Alternative 1 is associated with the highest amount of risks simply due to the sheer size and scale of the initial deployment to move each sector onto one common platform (SIS and ERP). The inclusion of all sectors to implement statewide SIS system and statewide ERP system in the scope brings significant, unknown complexities, since no other State has attempted to do so. Therefore, Alternative 1 is most likely to be affected by the risk of underestimating the need for resources, committing insufficient resources and obtaining stakeholder buy-in and commitment. Since all SIS and ERP systems in all K-12 school districts, community colleges,

and public universities will be replaced in Alternative 1, it carries a greater amount of risks in terms of obtaining executive/legislative support, continuous funding, user involvement, maintaining resources, etc. These risks are further described in the following table.

Table 14: Alternative 1 - Constraints and Risks

Risk Category	Risk Description
Business/ Organizational	Due to complexity of scope and associated costs and timelines, acquiring and maintaining executive and legislative support to fund the project will be difficult.
Business/ Organizational	Due to complexity of scope, obtaining buy-in and commitment from all institutions, and agencies will be challenging. Alternative 1 discusses implementing single source SIS and ERP systems for K-12 school districts (over 190), community colleges (approximately 17) and public universities (approximately 7).
Business/ Organizational	The new architecture may require significant changes to existing business processes of educational institutions and agencies.
Business/ Organizational	Adequate resources must be applied to ensure existing continuity of services during the system replacement.
Business/ Organizational	Significant amount of time and resources may be required for training end users and IT support staff on new systems, which may result in protracted learning curves, potential cost overruns, lower ROI in the short to medium term.
Business/ Organizational	Since existing systems, databases and data warehouses are replaced with new systems, intuitions/districts/agencies may be exposed to legal risks and associated costs related to terminating existing contracts with vendors.
Business/ Organizational	Additional resources may be required for supplementing or expanding the centralized data repository architecture to accommodate additional data from source systems, as the SLDS-P20W matures.
Project	The cost of implementing the Alternative 1 architecture is significantly higher and also subject to potential escalation in costs. Lack of continuous funding may affect the project adversely.
Project	This Alternative is associated with a wider scope and lengthy time line for implementation, therefore, will be more vulnerable to resource shortfalls.
Project	Existing resources may not be adequately skilled to support implementation and maintenance of new systems.
Project	The project is more likely to fall behind schedule due to multiple vendors' involvement resulting in higher potential for vendor defaults
Project	Lack of internal (OEIB/ODE) project management expertise in implementing a project on a similar scale, may adversely affect the project.
Project	Since Alternative 1 accounts for replacing SIS and ERP systems for K-12 school districts, community colleges, and universities, institutional specific changes (such as

Risk Category	Risk Description
	organizational changes in people, processes, and technology) and their agendas could delay the project significantly.
Technical	Delays in completing implementation work of the ELDS and the PRISM workforce reporting system could adversely affect the timelines of the project.
Technical	SIS vendors that develop products for all three sectors (K-12, CC, Universities) are limited, driving higher implementation costs and potential technical incompatibilities.
Technical	Smaller school districts may have limited or no IT infrastructure that can support the implementation of the K-12 SIS and the ERP without additional funding to support their infrastructure needs.
Technical	Historical student level data and institutional financial and HR data will be migrated into the new DW via an ETL process. Data quality issues in existing systems and agency data warehouses may affect the data migration process.
Technical	If there is a breach in security, there is greater exposure because of the large amount of data stored in one place.

Alternative 2.1 and 2.2

Alternative 2.1 replaces existing institutional SIS and ERP systems with a common, statewide SIS and ERP system for the K-12 sector. Oregon has approximately 196 school districts and implementing new SIS and ERP systems carries high risks in terms of managing organizational changes in people, processes, and technology. Particularly, a new ERP system affects many administrative processes of schools, school districts and other governmental agencies. In addition, there is high risk associated with obtaining stakeholder agreement to develop a uniformed chart of accounts and other cost tracking mechanisms, which are critical components of an ERP implementation.

Alternative 2.2 inherits similar risks due to its scope implementing a new, uniform SSIS for the K-12 school districts. Compared to Alternative 2.2, Alternative 2.1 inherits greater risks, mentioned below, due to its broader scope. However, due to the high number of integration points in Alternative 2.2, it carries higher technical risks. Please refer to the following table for various risks associated with both alternatives.

Table 15: Alternatives 2.1 and 2.2 - Constraints and Risks

Risk Category	Risk Description
Business/ Organizational	Due to complexity of scope and associated costs and timelines, acquiring and maintaining executive and legislative support to fund the project will be difficult.

Risk Category	Risk Description
Business/ Organizational	Due to complexity of scope, obtaining buy-in and commitment from all institutions, and agencies will be challenging. Alternative 2.1 accounts for implementing a single source SIS and ERP system for the K-12 school districts (over 190), while Alternative 2.2 for accounts for implementing a single source SIS for the K-12 sector.
Business/ Organizational	Adequate resources must be applied to ensure existing continuity of services during the replacement of existing SIS and ERP systems.
Business/ Organizational	Significant amount of time and resources may be required for training end users and IT support staff on new systems, which may result in protracted learning curves, potential cost overruns, lower ROI in the short to medium term.
Business/ Organizational	Alternative 2.1 and 2.2 may inherit some legal risks and associated costs related to terminating existing software licensing and maintenance contracts with vendors.
Business/ Organizational	Additional resources may be required for potentially supplementing or expanding the centralized data repository architecture to accommodate additional data from source systems, as the SLDS-P20W matures.
Project	The cost of implementing Alternatives 2.1 and 2.2 is significantly higher and also subject to increase in costs. Lack of continuous funding may affect the project adversely.
Project	Due to the complex scopes and lengthier timeline associated, both alternatives will be more vulnerable to resource shortfalls and changing requirements. This risk is greater for Alternative 2.1 compared to Alternative 2.2.
Project	ERP and SIS products in the market place are more advanced with new features and technologies compared to legacy systems that may exist in school districts. Existing resources may not be adequately skilled to support implementation and maintenance of new systems.
Project	Lack of internal (OEIB/ODE) project management expertise in implementing a project of similar scale, may adversely affect the project.
Project	Since Alternatives 2.1 and 2.2 account for replacing SIS and ERP systems for K-12 school districts, institutional specific changes (such as organizational changes in people, processes, and technology) and their agendas could delay the project significantly.
Technical	Data uniformity issues in existing SIS in community colleges and universities may adversely affect ETL processes and linking P-20W records.
Technical	Delays in completing implementation work of the ELDS and the PRISM workforce reporting system could adversely affect the timelines of the project.
Technical	Smaller school districts may have limited or no IT infrastructure that cannot support the implementation of the K-12 SIS and the ERP without additional funding to support their infrastructure needs.

Risk Category	Risk Description
Technical	Historical student level data and institutional financial and HR data will be migrated into the new DW via an ETL process. Data quality issues in existing systems and agency data warehouses may affect the data migration process.
Technical	If there is a breach in security, there is greater exposure because of the large amount of data stored in one place.
Technical	Alternative 2.2 may require building significant amount of interfaces to automatically load ERP data for the centralized data repository. ERP systems from 196 K-12 school districts will interface with the OEIB SDW (in addition to SIS and ERP systems from 17 community colleges and 7 universities), increasing potential technical defaults associated with developing and maintaining interfaces (platform inconsistencies and incompatibilities).

Alternative 3

Alternative 3 does not account for any changes at the transactional systems level, therefore, carries limited risks in terms of obtaining buy-in and commitment from agency/institutional stakeholders. However, potential data uniformity issues within the existing data systems and high number of data integration points carries certain amount of risks for Alternative 3 along with other business, project and technical risks as mentioned in the table below.

Table 16: Alternative 3 - Constraints and Risks

Risk Category	Risk Description
Business/ Organizational	Institutions may negatively respond to modifying their source systems, and data collection and reporting practices required to achieve data uniformity via the entire P-20 educational system.
Business/ Organizational	Lack of institutional support in terms of committing resources to establish process to ensure data quality of source systems (data cleansing processes and data quality check points) may adversely affect the project.
Business/ Organizational	Additional resources may require to potentially supplementing or expanding the centralized data repository architecture to accommodate additional data from source systems, as the SLDS-P20W matures.
Project	High number of interfaces and data quality issues in existing data systems may adversely affect the budgeted costs and time-lines of the project. Longer time periods may be required to determine requirements for ETL and data provision.

Risk Category	Risk Description
Project	Vendor resources may not be adequately skilled to develop custom interfaces required to build the OEIB SDW.
Technical	Data uniformity issues in existing SIS and ERP systems of school districts, community colleges and universities may adversely affect ETL processes and linking P-20W records.
Technical	Delays in completing implementation work of the ELDS and the PRISM workforce reporting system to generate data could adversely affect the timelines of the project.
Technical	Institutions may utilize legacy platforms that are not willing to allow access and share data with the centralized data repository. In addition, institutors may not maintain proper infrastructure that support the OEIB SDW along with ETL tools
Technical	Historical student level data and institutional financial and HR data will be migrated into the new DW via an ETL process. Data quality issues in existing systems and agency data warehouses may affect the data migration process.
Technical	If there is a breach in security, there is greater exposure because of the large amount of data stored in one place.
Technical	Alternative 3 may require building significant amount of interfaces to automatically load ERP data for the centralized data repository. ERP systems from 196 K-12 school districts will interface with the OEIB SDW (in addition to SIS and ERP systems from 17 community colleges and 7 universities), increasing potential technical defaults associated with developing and maintaining interfaces (platform inconsistencies and incompatibilities).
Technical	Lack of proper data cleaning processes applied by the source system institutions may affect the data quality.

Alternatives 4 & 5

Alternatives 4 and 5 are proposing to implement a federated data system (virtual data warehouse), where users submit queries via a shared intermediary interface which searches the independent data sources. In this model, data are queried from the source system and records are matched to provide information needed for users (matched records are not stored within the federated system). Based on these assumptions, Alternatives 4 and 5 inherit risks primarily related to performance of the independent data sources. In addition, unlike centralized data warehouse systems, federated models are a relatively new technology which accounts for less than 10 percent of data warehouse projects.

ODE PK-12 DW and the new HECC DW will be the primary data sources for submitting queries to link P-20W records and also to collect institutional financial, HR and performance data needed for policy makers and researchers. Alternatives 4 and 5 are associated with building one of the primary data sources, the HECC DW and an SLDS, which links post-

secondary student data from community colleges and universities. It assumes ODE PK-12 DW and the SLDS have been implemented according to a common data standard, with limited data quality issues in linking early learning data and K-12 data. Data quality issues in the ODE PK-12 DW and the existing higher education agency DW's, and various other agency specific performance issues may impact the overall performance of the federated data system.

Alternative 4 accounts for implementing an "Achievement" data warehouse to store student achievement data, while providing an interface for students and families for their Personal Achievement Record (PAR). The continuing cost of developing and delivering the PAR on demand could be substantial and a growing number of users (could be millions of additional users) would have to be given online access to view their PAR, which may result in privacy/security concerns. Please refer to the following table for various risks associated with Alternatives 4 and 5.

Table 17: Alternative 4 & 5- Constraints and Risks

Risk Category	Risk Description
Business/ Organizational	The current community college and university agency data warehouses need to be maintained during the implementation of a new HECC DW+SLDS system. In addition, HECC resources will be required to provide resources to maintain the HECC DW and the SLDS, and BI portals.
Business/ Organizational	Additional trained staff resources are required from each agency to oversee and maintain source systems (data quality processes, etc.).
Business/ Organizational	Since individual source systems maintain control over data, lack of institutional communication and collaboration in updating the data extract processes that reflects modifications to data elements may adversely affect the project.
Project	Existing independent data sources may not collect the student/financial/human resource data required to answer policy questions or Achievement Compact data. For example, K-12 agency DW does not contain institutional financial information (financial and human resource data collected by regional data warehouses are limited and inconsistent).
Project	Existing resources may not be adequately skilled to support implementation and maintenance of new systems.
Project	Significant level of effort may require to modifying institutional source systems and data collection and reporting practices required to achieve data uniformity via the entire P-20 educational system.
Technical	Delays in completing implementation work of the ELDS and the PRISM workforce reporting system could adversely affect the timelines of the project.
Project	Alternatives 4 and 5 are associated with building one of the primary data sources, the HECC DW and an SLDS, which links post-secondary student data from community colleges and universities. Lack of data uniformity in the existing community college and university DW's could negatively impact the cost, schedule and data quality of the HECC DW.

Risk Category	Risk Description
Technical	Data uniformity issues in existing age of school districts, community colleges and universities may adversely affect ETL processes and linking P-20W records.
Technical	Alternatives 4 and 5 are associated with various performance issues (such as delays in data delivery due to load on source systems) due to agency specific technical performance issues of the independent data sources.
Technical	Lack of required hardware and network bandwidth from the existing data sources to facilitate and process external queries (ETL tools), conduct matching processes and returning the resulting dataset, could adversely affect the project.
Technical	Establishing processes for ETL when data are changed in an agency DW (or at a specific periodicity to capture changes, corrections, or updates) could be challenging.
Technical	When users access independent data sources real time using federated queries, there is an risk of performance (ex . response time) for the source system. Alternatives 4 and 5 will give separate BI tools and access to the ODE K-12 DW and the HECC DW for staff members.
Technical	Compared to Alternative 4, Alternative 5 inherits additional security risks due to the inclusion of PAR in its scope. Proving public access to PAR may raise security threats.

Approach and Summary Findings:

The Chief Education Officer is responsible for choosing which alternative to select, including the option to do nothing. The CEO directed the OEIB-SLDS Project Manager to use two processes to gather information and make a recommendation: (1) a facilitated discussion of the alternatives with the OEIB Staff, the Deputy Superintendent of Instruction and his staff, and the HECC Executive Director that culminated in a recommendation; (2) an analysis by the OEIB-SLDS Project Team that culminated in each team member scoring the alternatives using a weighted criterion based approach. Each independent process resulted in the same choice of alternative.

OEIB, ODE, and HECC agency leaders analyzed the benefits and costs of the various alternatives, especially the key question of whether to adopt a centralized or federated approach for the OEIB-SLDS. They presented their agency's relative readiness for each alternative and the affect a given alternative would have on districts, schools, colleges, and universities. They assessed the ability of the OEIB to project manage each alternative, and they discussed how OEIB sunset planning would connect to the implementation of each alternative. Their final recommendation was Alternative 4.

RNR Consulting provided a form for the OEIB-SLDS Project Team members to rank each alternative based on the criteria established below. Each item in the criteria was established a weighted score to account for the differences in their importance. A rating scale of 1-10, 1

being lowest degree to satisfy the criteria, and 10 being highest degree to satisfy the criteria, was utilized to score each alternative. Based on the scores assigned by the OEIB-SLDS Project Team for each alternative, weighted averages were calculated. The following table is a summary of calculated weighted scores for each alternative. Alternative 4 received the highest weighted score (see Table 18 below).

Table 18: Weighted Scoring of OEIB-SLDS Alternatives by Project Team members

Alternatives	Evaluation Criteria					Scores	
Description	Alignment with OEIB goals and functionality	Costs	Risk exposure	Security	Future opportunities	Total Score (Sum of scores)	Weighted Score (Sum of (scores * weights)
	Weighted Scores						
	30%	15%	25%	20%	10%		
	OEIB Project Team Scoring (Rating Scale 1-10, 1= Do not satisfy the criteria, 10= Fully satisfy the criteria)						
Alternative 1 *(New SIS & ERP systems for all three sectors and OEIB State DW, User portals, Policy/Research BI solution, PAR)*	37.0	2.8	10.0	14.0	33.0	96.8	20.1
Alternative 2.1 *(New K-12 SIS & ERP systems and OEIB State DW, User portals, Policy/Research BI solution, PAR)*	34.0	4.6	13.6	18.0	27.0	97.2	20.6
Alternative 2.2 *(New K-12 SIS and OEIB State DW, User portals, Policy/Research BI solution, PAR)*	31.0	6.4	17.6	18.0	23.0	96.0	20.6
Alternative 3 *(New OEIB State DW, User portals, Policy/Research BI solution, PAR)*	27.0	21.6	25.0	23.0	18.0	114.6	24.0
Alternative 4 *(New HECC DW, Interagency matching, Agency and Policy/Research BI solutions, PAR)*	27.0	28.4	28.6	25.0	16.0	125.0	26.1
Alternative 5 *(New HECC DW, Interagency matching, Agency and Policy/Research BI solutions)*	20.0	40.0	28.6	26.0	11.0	125.6	25.5

Conclusions and Recommendations

This section summarizes the conclusions from the business case analysis and provides recommendations for proceeding.

Conclusions

The Oregon Education Investment Board (OEIB) is required in statute to provide "an integrated, statewide, student-based data system that monitors expenditures and returns on investments." The OEIB currently has no data system. In response to this fact, OEIB initiated an effort to develop this system.

This proposed system is new and is described in general terms in the statute. It has been two years since the passage of the law and, over time, many perspectives have arisen among stakeholders with respect to what problems this system is supposed to solve and what opportunities this system offers. In addition, because there exist data systems that already hold a great deal student-based data and already have sharing agreements, it is critical to examine what is in existence.

The OEIB-SLDS project team conducted extensive interviews with key stakeholders, reviewed and compared the longitudinal education systems in all other states, put forth draft models to conceptualized the problems and opportunities, and iteratively improved the understanding and discrimination of the key business drivers relevant to the proposed system:

- Improved ability to support optimal investments and conduct policy analysis and research
- Improved ability to support local and regional Achievement Compacts
- Enhanced operational coordination between agencies
- Enhanced support for individual students to understand their achievement levels, set goals, track progress, and share data with schools and employers

These drivers clarify the purpose and scope for the proposed system. The new OEIB-SLDS will meet the requirements of the law and provide a significant return on investment; it will be a valuable tool for meeting the State's goals of 40/40/20 for every Oregonian student.

In preparation of this business case, RNR Consulting, Inc., analyzed these approaches for providing OEIB-SLDS functionality:

Alternative 1: *New School Information System (SIS) and Enterprise Resource Planning (ERP) systems for all three sectors and OEIB State DW, User portals, Policy/Research BI solution, Personal Achievement Record (PAR)*.

Alternative 2.1: *New K-12 SIS & ERP systems and OEIB State DW, User portals, Policy/Research BI solution, PAR*.

Alternative 2.2: *New K-12 SIS and OEIB State DW, User portals, Policy/Research BI solution, PAR.*

Alternative 3: *New OEIB State DW, User portals, Policy/Research BI solution, PAR.*

Alternative 4: *New HECC DW, Interagency matching, Agency and Policy/Research BI solutions, PAR.*

Alternative 5: *New HECC DW, Interagency matching, Agency and Policy/Research BI solutions.*

Alternative 6: *Do nothing.*

Alternative 6 did not meet OEIB requirements

Doing nothing fails to meet the statutory requirement for the OEIB to provide a data system. In addition, the specific identified problems that generated a legislative action to create this system are not currently addressed by any existing systems. OEIB is the only agency whose purview includes collection and combination of data from all educational agencies, institutions, and partners. If the OEIB does nothing in this regard, all of the problems identified will continue and the opportunities will not be realized.

Alternatives 1, 2.1, 2.2, 3 are viable centralized alternatives for proceeding

These alternatives share the common characteristic that they stipulate the creation of a new centralized data warehouse that consolidates services and replaces existing systems.

Alternative 1: *New School Information System (SIS) and Enterprise Resource Planning (ERP) systems for all three sectors and OEIB State DW, User portals, Policy/Research BI solution, Personal Achievement Record (PAR)*.

Replacing all Student Information Systems (SIS) and Enterprise Resource Planning (ERP) systems and creating a new collection system for a single new data warehouse is the highest cost alternative to implement. This centralized approach has the longest implementation timeline, affects the greatest number of stakeholders, and carries the highest project risk.

Although this alternative meets the agency goals and carries with it a high potential for future benefits, it is more than ten times more costly to implement than other alternatives. With respect to the affect on local districts, colleges, and universities, this plan would pay for local services that are mission-critical and thus save them considerable cost that they otherwise would be buying or building. However, these same institutions would incur costs for implementation, including staff time for training, data conversion, and increased customer support. Finally, past history in Oregon with respect to common K-12 systems has shown that there exists significant resistance to top-down approaches.

The creation of an OEIB data warehouse to supplant those already in existence at the ODE, CCWD, and the OUS carries increased functionality at the cost of significant increased risk to the project. In place of critical systems that are currently meeting agency needs, this alternative creates a new system that must meet all of the current needs as well as solve the OEIB problems.

Alternative 2.1: *New K-12 SIS & ERP systems and OEIB State DW, User portals, Policy/Research BI solution, PAR*.

Alternative 2.2: *New K-12 SIS and OEIB State DW, User portals, Policy/Research BI solution, PAR.*

The two versions of Alternative 2 are similar to Alternative 1. The key difference is that neither of these alternatives calls for any changes to the transactional systems at the community college or university level. Each of these alternatives are centralized approaches that have long implementation timelines, affect a very large number of stakeholders, and carry very high risk project risk. Alternative 2.1 is five times more costly than other options, while alternative 2.2 is four times more costly.

Alternative 3: *New OEIB State DW, User portals, Policy/Research BI solution, PAR.*

Alternative 3 makes no changes to any institutional transactional systems. This approach has still has a long implementation timeline because of the need to migrate data collection and reporting responsibilities to a new data warehouse system. It affects a large number of stakeholders and carries moderate project risk.

Alternatives 4 and 5 are viable federated alternatives for proceeding

These alternatives share the common characteristic that they do not replace data warehouses already in existence. The OEIB-SLDS would be a consumer of data from the ODE and the HECC.

Alternative 4: *New HECC DW, Interagency matching, Agency and Policy/Research BI solutions, PAR.*

Alternative 4 builds on the substantial existing work led by the Oregon Department of Education to create a data warehouse for K-12 and to link that data to student level data from community colleges and universities (Project ALDER). Alternative 4 is a federated approach that has a shorter implementation timeline than any of the centralized approaches, and carries low project risk.

This alternative meets all of the agency goals, but it does not allow for the same degree of future benefits as centralized methods. From the perspective of K-12 schools, staff will see no change in the data they already report. From the perspective of community colleges and universities, they will continue the current methods of reporting (OCCURS and SCARF

respectively), but they will report that to the HECC. Implementation support is necessary for the HECC to migrate the existing data system from OUS and build its own data warehouse.

On the key issue of information security, Alternative 4 maintains the existing model where sensitive and personally identifiable data are kept locally whenever possible. The OEIB-SLDS will be refreshed a few times per year in a secure process where student records from ODE are matched to records from the HECC, linked to create longitudinal records, and then immediately de-identified. The OEIB-SLDS will have no live connection to any database with personally identifiable information. This information-dense snapshot will provide the data for the OEIB business intelligence system t for policy makers.

With respect to the Personal Achievement Record (PAR), Alternative 4 maintains a database with a defined amount of storage space for every P-20 student in Oregon. These student data would be updated with information from ODE and HECC and matched to the right student. These records would not include name, address, demographics, or any other identifying data. Student access will require at least a double-authentication process and the student will only see achievement data.

Alternative 5: *New HECC DW, Interagency matching, Agency and Policy/Research BI solutions.*

Alternative 4 is identical to Alternative 5, with the exception that it does not provide for a statewide Personal Achievement Record (PAR). It is a federated approach that the shortest implementation timeline and carries the low project risk.

This alternative meets all of the agency goals, but it is the least likely to produce future benefits.

With respect to the PAR, Alternative 5 mandates the use of an electronic record by school and/or agency staff that meets the requirements and that is commonly understood, sent, and received in P-20 institutions in the same format. The cost and assessment of project risk does not consider the district costs in meeting this new reporting requirement.

Recommendations

The recommendation to the Chief Education Officer is Alternative 4. It was the consensus choice of the agency leaders, who must collaborate for the project to be successful. The OEIB-SLDS Project Team also rated it as the best alternative. Both groups considered the extent to which the each alternative met agency goals; the potential for future opportunities; security; risk; and cost. In addition, agency leaders discussed stakeholder concerns and how to avoid any workload increases in districts, schools, colleges, and universities.

Based on the Project Team's analysis and rankings and the discussions and decision of the agency leaders, the rationale for choosing Alternative 4 is as follows:

1. Alternatives 1, 2.1, and 2.2 are all too costly and carry too much project risk. Because of the clear benefits to having standardized Student Information Systems (SIS) and

Enterprise Resource Planning (ERP) systems, the project team sees the value in such approaches; however the value is not great enough to recommend this as a task for the OEIB.

2. Alternative 3 is the least costly centralized approach. It provides for future applications beyond a policy database. However, creating a new data warehouse that will contain live personally identifiable data carries unacceptable project risk; also, it does not leverage and build on existing work.
3. Because we are not able to capture local impacts of centralized approaches, all of the centralized models will incur unknown level of costs and programmatic changes to the local districts, colleges, and universities. This adds unacceptable risks to the success of this project.
4. The federated models (4 and 5) are the least costly and least risky. They have the least impact to schools, districts, colleges, and universities.
5. Federated models have been chosen and implemented successfully in other states.
6. A federated model is broadly understood by the staff at OEIB, ODE, CCWD, OUS, and HECC and it is the favored design option.
7. Alternative 4 and 5 builds on existing efforts, standards, relationships, and sharing agreements between the ODE, CCWD, OUS, HECC, OED, OHA, and DHS.
8. Alternative 5 meets the requirement for a Personal Achievement Record (PAR) by enacting an unfunded mandate on districts, colleges, and universities. The cost savings of 5 versus 4 are transferred in whole or part to institutions.
9. Alternative 5 will be more sensitive to data loss or errors when students change schools.
10. The Personal Achievement Record (PAR) of Alternative 4 provides greater future benefits. Having a standard and responsive design will make the platform more predictable for developers and thus enable the faster creation of goal setting and planning tools for students.

Expected Return on Investment

Alternative 4 will take three years to fully implement and will cost $8,595,102. What is the expected return on this investment?

Without the OEIB-SLDS, there is no method to measure the return on any investment or policy that spans P-20W. Currently, it is impossible for the OEIB, ODE, or HECC to measure their own long-term returns on investments because there is no system designed to do that task. Once the OEIB-SLDS is created, every future proposed expenditure or policy will use the data system to produce baseline and progress data and set goals. Therefore, the return on the investment for this project includes the value of future opportunities to measure ROI on subsequent initiatives. Presumably, this fact explains why the OEIB was charged in Senate Bill 909 with producting this SLDS. A more extended discussion of the financial benefits to the state as a result of improved educational outcomes can be found in the Benefits section above.

<u>Expected financial benefits of the OEIB-SLDS</u>

- Better informed new strategic investments
- Increased high school graduation rates and increased rates of students entering post-secondary schools

- The ability to evaluate of the effectiveness of current strategic investments to determine where best to spend in the future
- A coordinated and more sensible budget requests from historically disjointed agencies that solves problems more economically
- A more granular view of the data with respect to specific interventions and expenditures and their affects on student achievement that provides business intelligence to districts, schools, community colleges, and universities to improve their budgeting
- The ability to comprehensively track expenditures and outcomes across agencies (i.e. Early Learning Hubs) will allow for better cost/benefit analysis
- Enhanced operational coordination between agencies and reduction of duplicated efforts between institutions

Expected non-financial benefits of the OEIB-SLDS

- A secure longitudinal data system that provides no access to identifiable data and no link to live data
- A scoreboard that shows statewide longitudinal progress towards educational goals that lead to 40/40/20
- Support for coordinated P-20W policy analysis and policy recommendations
- Connection to the emerging Early Learning data system, which will allow for staff to benefit from cross-sector knowledge
- Universal support for all students to understand their achievement, set goals, track progress, and share data with schools and employers
- Improved ability to support local and regional Achievement Compacts by supplying local longitudinal data and business intelligence tools
- Reduced workload for districts, community colleges, and universities to submit achievement compact goals and data
  The opportunity to easily research, analyze, and build predictive models informed by a deep set of Oregon student data that spans P-20W
- Support for continued or expanded data sharing with other agencies

It is important to note that alternative 4 does not replace existing data systems across institutions in Oregon. Therefore, this alternative will not directly improve problems that stem from differing data systems. There will be neither an increase nor a reducting in workload for teachers and other school staff. The benefits that will be delivered will be clearer and more equitable data sharing agreements and better statewide reports from OEIB, ODE, and HECC.

Project Plan

Once this project begins, the design is to have all of the program requirements met within 36 months. The high level plan schedule, broken into phases, is included in Appendix 9. This plan is taken from the Project Plan (P20WProjMgmtPlan) submitted with this business case. Appendix 10, The Spend Plan, is based on this phased schedule.

In the projected timeline, the de-identified policy/research database and business intelligence systems would be the first part completed, with the student's PAR deployed after. However,

work will begin on both deliverables at the project start data. Both deliverables will be drawing data from the same sources and both will require future support from the same groups.

The project plan and the timeline is necessarily vauge on the topic of exactly what will be built and maintained by OEIB personnel and what will be bought either as a product or as a service. The assumptions for the spending plan are that the OEIB and HECC will have some staffing and that they will also be purchasing disk space, software, support, training, etc. RNR based their cost estimates on comparison and analyses of cost models for similar SLDS systems in other states. One of the goals of the Quality Assurance activities, which would begin on the project start date, is an analysis and recommendation of what is the right fit (build vs. buy) given the purpose of these systems and the contexts in which they are being created and deployed.

As noted in the Spend Plan (Appendix 10), once the decision is made to fund this project and before funds arrive at the disposal of the OEIB, the Project Team will begin in-kind activities that will allow for the rapid project ramp up. These preparatory activities will be funded from the remaining resources provided in SB 5518A.

Key Considerations Moving Forward

In the October 4, 2012 Education Funding Team summary recommendation to the Governor, the OEIB is encouraged to build the SLDS and to oversee the creation of a Data Governance Council (DGC). The current educational data governance committee, the ALDER Executive Committee, offered recommendations in January 2014 as to the priorities and activities of a DGC, possible membership, and meeting frequency. The key activities include establishing research and policy priorities that will inform the development process, negotiating barriers that cannot be overcome by technical staff, reviewing safety and security protocols, evaluating progress. The project plan includes the development of the DGC.

The choosen alternative requires that the Higher Education Coordinating Commission buys or builds a data warehouse that can contain student-level data from community colleges, public universities, and some private career and technical schools in the future. CCWD, which will be governed by the HECC starting in June, currently holds data from the community colleges. The Oregon University System's Chancellor's Office currently holds data from the public universities. This plan provides the budget for the HECC to assume ownership of the OUS historical data set and to take on the role of gathering it into the future from all the public universities. This approach does not incur any increased workload at the university level and it provides a value add with the creation of a HECC business intelligence system. However, this arrangement of data reporting from the soon to be independent public universities to the HECC has not yet been negotiated.

The OEIB is destined to sunset as an agency in March 2016. In discussions with the agency heads from OEIB, ODE and HECC, the group agreed on the following recommendation: the OEIB should assume responsibility for the overall project planning and implementation from the project start date until August 2015. At that time, if the sunset is still in effect, the ownership would transfer to the HECC. The HECC was judged to be the better owner than the ODE for three key reasons: (1) The key end outcomes for Oregon's education are post-secondary; (2) HECC would already be working with student data that contains SSN's and therefore would be

better prepared to do P-20W matching; (3) The Personal Achievement Record is meant to stay with students thoughout their career and into the workforce.

The OEIB and the ODE will work collaboratively to maintain the required support services outside of the budget of this project, including, but not limited to project management, financial analysis, human resources, and procurement. Both the OEIB and the HECC are aware that the original request for this project is for implementation and support activits for only 36 months and that there will be a need for ongoing support going forward.

Consequences of Failure to Act

The OEIB was created in law to enact change sufficient in Oregon to achieve the goals of 40/40/20. As the OEIB was created, it was also given the directive to create a data system. Therefore, one key consequence of a failure to act on the recommendation of this case is a prolonged state where this object is not met. The chosen alternative is the most cost-effective approach that sufficiently meets the requirements of an OEIB-SLDS.

With respect to educational improvement in Oregon, new policy and investment work at the OEIB, ODE, and HECC will continue to proceed with insufficient Oregon data. The continuous improvement of the Achievement Compact process will not have the advantage of advanced business intelligence tools. Students will not have equitable access to their own achievement data and goal setting tools.

Appendixes and References

Appendix 1: Oregon State Educational System Governance Chart

Appendix 2: Frequently Asked Questions

Appendix 3: Detailed Cost Assessment

Appendix 4: Detailed Cost Assumptions

Appendix 5: Detailed OEIB-SLDS Requirements

Appendix 6: OEIB-SLDS Project Definitions and Acronyms List

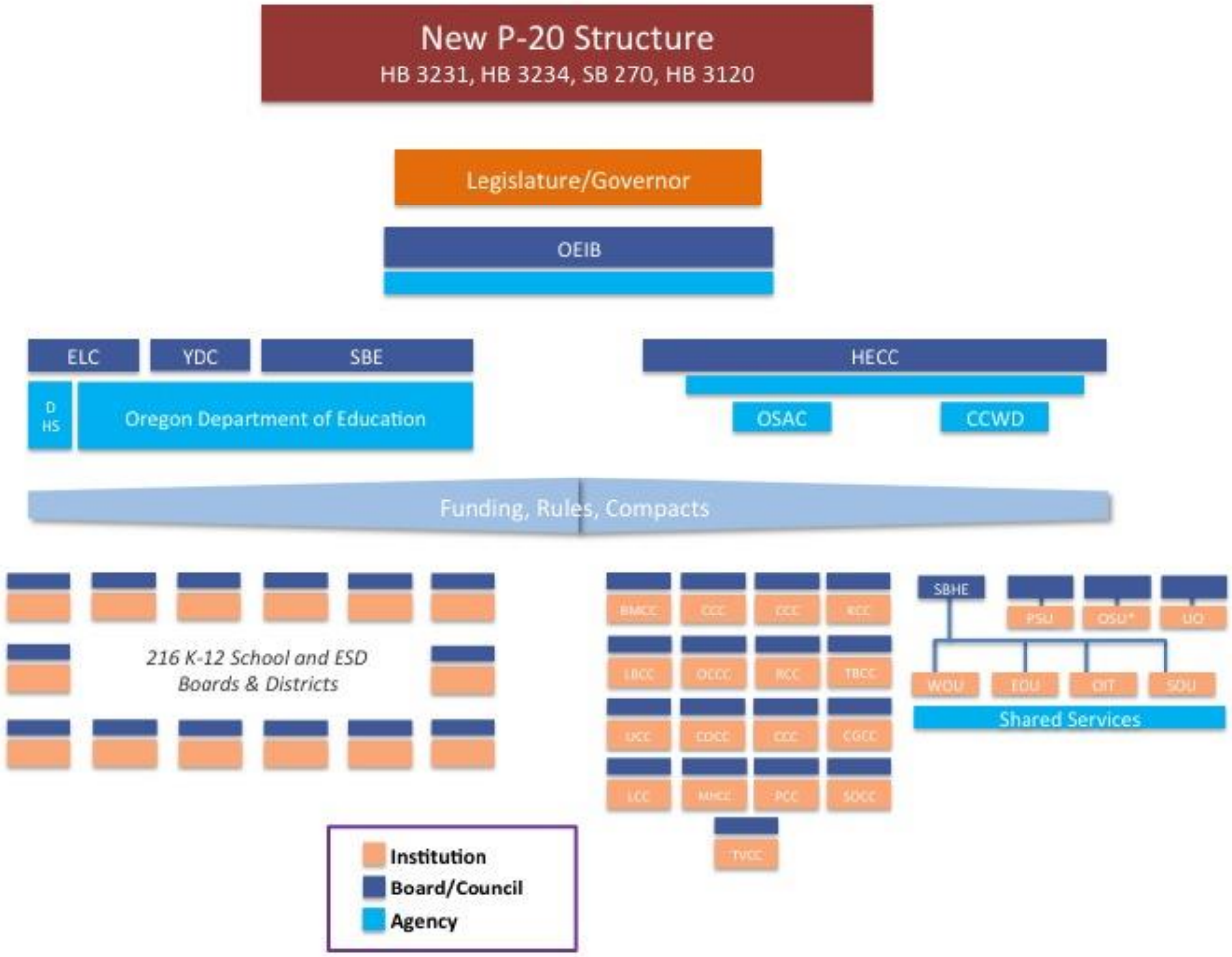
Appendix 7: Research Relevant to Personal Achievement Record

Appendix 8: State Economic Benefits for Possible Educational Outcomes

Appendix 9: Project Schedule

Appendix 10: Spend Plan

Appendix 1: Oregon State Educational System Governance Chart



Appendix 2: Frequently Asked Questions

OEIB-SLDS for P-20W Education
Frequently Asked Questions

Q: What problems does the OEIB database solve?

A: (1) the state has no method to effectively track longitudinal educational outcomes resulting from over $12 billion of public spending; (2) the commissions, agencies, and institutions governed by the OEIB have incompatible data systems; (3) students and families do not have sufficient and meaningful access to their personal longitudinal record of achievement.

Q: What will a longitudinal database allows us to do?

A: (1) it will allow policy makers to track statewide educational outcomes for students as they move through the system into the world of work; (2) it will create a more seamless system between institutions and agencies, resulting in greater efficiencies for staff, less hassle for students and parents, and more expedited services for students who need extra help; (3) students and families will have equitable access to their achievement data that is portable and personal for them; they will also have tools to connect future goals to current decision-making.

Q: Who will be the end users of the longitudinal database?

A: The “policy database” will be de-identified so that it can be used by legislators and other policy makers. It is not intended for agency or institution staff to access student data—they already have internal systems to do that. The “personal student database” will be available for students and families only and will persist for their educational career and beyond.

Q: Will the longitudinal database contain personally identifiable information?

A: No. To create a longitudinal record between institutions, agencies, and the workforce, an intermediary step will be performed in a very secure and inaccessible environment. Once the records are linked, the results will be de-identified.

Q: Is there any risk associated with the intermediary step that links student records?

A: Yes. It is conceptually impossible to create the longitudinal database without exposing that data to some degree. However, that risk can be managed through effective design, extremely limited access, and monitoring.

Q: How are we determining what the needs are for this database project?

A: As part of the development of the business case, project staff are interviewing key stakeholder groups. These groups include existing data steering committees (ALDER and ELC); boards and commissions (OEIB and QEC); key agency staff at ODE, OED, CCWD, OUS, ELD, and HECC; professional organizations (COSA and OEA), district superintendents and IT directors; business partners (OBC and Chambers of Commerce); school administrators; teachers; parents; students; and other community members. We are also interested in your feedback.

Q: How are we investigating alternative solutions for this database project?

A: Based on the needs assessments, design specifications will be developed which will allow us to propose alternate solutions. These alternates will be compared with respect to their relative costs, implementation considerations, and functionality. In addition, the Project Team has analyzed other similar database projects in other states.

Q: How does this project relate to the Oregon Department of Education's ALDER project?

A: ALDER as currently designed cannot solve all of the problems indicated above. Alternatives will likely include replacing ALDER or using ALDER as a key source for the OEIB longitudinal data system.

Q: What is the scope of this longitudinal data system?

A: Early Learning (which includes data from early learning providers, the Department of Human Services, and the Oregon Health Authority), K-12 public schools, Public Universities, Community Colleges, Licensed Professional and Technical Schools, and Workforce Data.

Q: Will this system replace what teachers, administrators, and other staff use in their schools, colleges, and universities?

A: No. Collectively, state institutions have invested heavily into systems for their staff based on the needs in their local context and systems are substantially in place to report data to the state. It is likely that the development of the OEIB longitudinal database will ultimately change some of the reporting requirements of the local systems.

Q: Will this increase workload on school staffs?

A: No. In fact, the state agencies involved in this project are interested in decreasing workload and increasing efficiency in two ways: simplifying reporting procedures and providing standardized reports back to schools.

Q: Will this decrease workload on school staffs?

A: No. Because it maintains status quo at public schools, districts, community colleges, and public universities, it will not decrease workload.

Q: What are the laws govern the privacy of the data included in the proposed OEIB longitudinal database system?

A: (1) Educational records security is governed by FERPA; (2) Medical records security is governed by HIPPA; (3) DHS data and Workforce data (that uses SSN's) is governed by the Federal Privacy Act.

Q: Has there been an inventory of the information that is already collected by ODE, OUS, school districts and other entities to determine what the current data universe is?

A: Yes. Each core agency in the requisite data supply chain has a data dictionary identifying the elements collected by their agency and the accompanying definitions. To date, a master dictionary has not been assembled spanning all required agencies nor has the governance been established over the data supply chain to ensure conformity of the data elements. The creation of a complete shared data dictionary, containing available data elements for all agencies, is an initial task to be completed under this project. This task leverages and will be accelerated by work initiated under the ALDER project.

Q: Has there been an assessment or a needs analysis completed (including costs) of what has to be done at HECC, ODE, local school districts, and the other entities that will "feed" data to the data warehouses assumed in this project?

A: (1) ODE has evaluated its current data supply chain to evaluate its completeness, accuracy, and timeliness. It is proposing improvements on that design as part of the ALDER project that incorporates the design principals of ensuring a complete and accurate K-12 data set; reducing reporting burden on K-12 districts; and providing all districts with access to meaningful student level data informing student achievement. This is an on-going process and a goal of ODE irrespective of the OEIB-SLDS project. (2) The supply chain of data from Community Colleges to the CCWD and from public universities to the OUS is solid and a new HECC data warehouse will not require changes at the community college or university level. The key agreement not yet in place details the proposed ownership change from OUS to HECC for the university student-level data. A value add from this project is that the new HECC system will incorporate business intelligence systems that will give relevant data back to the institutions.

Appendix 3: Detailed Cost Assessment

Alternative 1:

Cost Categories & Sub Categories	Initial Cost	Maintenance & Warranty Cost						Total Cost
		Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost	Total Maintenance & Warranty Cost	
Hardware Costs								
Hardware Purchase, Configuration and Deployment								
K-12 SIS	$ 1,944,813							$ 1,944,813
K-12 ERP	$ 1,250,000							$ 1,250,000
CC SIS	$ 504,445							$ 504,445
CC ERP	$ 457,350							$ 457,350
UNIV SIS	$ 355,605							$ 355,605
UNIV ERP	$ 228,675							$ 228,675
OEIB SDW+SLDS	$ 210,000							$ 210,000
Portals	$ 57,000							$ 57,000
Personal Achievement Record	$ 48,000							$ 48,000
Total Hardware Costs								$ 5,055,889
Software costs								
Application Licenses								
K-12 SIS	$ 6,764,568	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 12,683,565	$ 19,448,133
K-12 ERP	$ 3,889,354	$ 908,215	$ 908,215	$ 908,215	$ 928,154	$ 955,999	$ 4,608,798	$ 8,498,152
CC SIS	$ 1,754,592	$ 657,972	$ 657,972	$ 657,972	$ 657,972	$ 657,972	$ 3,289,860	$ 5,044,452
CC ERP	$ 1,755,150	$ 386,133	$ 386,133	$ 386,133	$ 386,133	$ 386,133	$ 1,930,665	$ 3,685,815
UNIV SIS	$ 1,236,888	$ 463,833	$ 463,833	$ 463,833	$ 463,833	$ 463,833	$ 2,319,165	$ 3,556,053
UNIV ERP	$ 877,575	$ 193,067	$ 193,067	$ 193,067	$ 193,067	$ 193,067	$ 965,333	$ 1,842,908
OEIB SDW+SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
BI Portals	$ 87,000	$ 19,140	$ 19,140	$ 19,140	$ 19,140	$ 19,140	$ 95,700	$ 182,700
Total Application License Cost	$ 16,489,627	$ 5,183,748	$ 5,183,748	$ 5,183,748	$ 5,203,687	$ 5,231,532	$ 25,986,461	$ 42,476,088
Application Integration Tools (ETL Licenses, User Interface Portal Licenses) (if needed)								
OEIB SDW+SLDS	$ 281,523	$ 42,228	$ 42,228	$ 42,228	$ 42,228	$ 42,228	$ 211,142	$ 492,665
Total Application Integration License Costs	$ 281,523	$ 42,228	$ 42,228	$ 42,228	$ 42,228	$ 42,228	$ 211,142	$ 492,665
Database Licenses								
Database Licenses for SLDS	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Database License Costs	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Software Cost	$ 16,971,150	$ 5,269,976	$ 5,269,976	$ 5,269,976	$ 5,289,915	$ 5,317,760	$ 26,417,603	$ 43,388,753

Alternative 1 (cont):

Implementation Costs			
Requirements, Process & Workflow Analysis			
	K-12 SIS	**$ 312,000**	**$ 312,000**
	K-12 ERP	**$ 499,200**	**$ 499,200**
	CC SIS	**$ 312,000**	**$ 312,000**
	CC ERP	**$ 353,600**	**$ 353,600**
	UNIV SIS	**$ 187,200**	**$ 187,200**
	UNIV ERP	**$ 353,600**	**$ 353,600**
	Portals	**$ 124,800**	**$ 124,800**
	OEIB P-20W SLDS	**$ 130,700**	**$ 130,700**
	Personal Achievement Record	**$ 374,400**	**$ 374,400**
Total Requirements, Process & Workflow Analysis Costs		**$ 2,647,500**	**$ 2,647,500**
System Design, Development & Testing			
	K-12 SIS	**$ 1,127,428**	**$ 1,127,428**
	K-12 ERP	**$ 901,942**	**$ 901,942**
	CC SIS	**$ 2,029,370**	**$ 2,029,370**
	CC ERP	**$ 3,382,284**	**$ 3,382,284**
	UNIV SIS	**$ 2,029,370**	**$ 2,029,370**
	UNIV ERP	**$ 3,382,284**	**$ 3,382,284**
	OEIB SDW+P20W SLDS	**$ 299,970**	**$ 299,970**
	Portals	**$ 163,620**	**$ 163,620**
	Personal Achievement Record	**$ 101,250**	**$ 101,250**
Total System Design, Development and Testing Costs		**$ 13,417,519**	**$ 13,417,519**
ETL Design, Development & Testing			
	K-12 SIS	**$ 67,500**	**$ 67,500**
	K-12 ERP	**$ 54,000**	**$ 54,000**
	CC SIS	**$ 121,500**	**$ 121,500**
	CC ERP	**$ 202,500**	**$ 202,500**
	UNIV SIS	**$ 121,500**	**$ 121,500**
	UNIV ERP	**$ 202,500**	**$ 202,500**
	OEIB P-20W SLDS	**$ 77,900**	**$ 77,900**
Total ETL Design, Development & Testing		**$ 847,400**	**$ 847,400**
Systems Integration			
	ELDS+PRISM	**$ 135,000**	**$ 135,000**
Total System Integration Costs		**$ 135,000**	**$ 135,000**
Report Development including Customizations & Modifications			
	K-12 SIS	**$ 250,000**	**$ 250,000**
	K-12 ERP	**$ 200,000**	**$ 200,000**
	CC SIS	**$ 200,000**	**$ 200,000**
	CC ERP	**$ 100,000**	**$ 100,000**
	UNIV SIS	**$ 200,000**	**$ 200,000**
	UNIV ERP	**$ 100,000**	**$ 100,000**
	BI Portals	**$ 121,500**	**$ 121,500**
Total Cost for Report Development		**$ 1,171,500**	**$ 1,171,500**
Total Implementation Costs			**$ 18,218,919**
Other Costs			
Training & Training Materials			
	K-12 SIS	**$ 845,571**	**$ 845,571**
	K-12 ERP	**$ 1,358,899**	**$ 1,358,899**
	CC SIS	**$ 219,324**	**$ 219,324**
	CC ERP	**$ 899,147**	**$ 899,147**
	UNIV SIS	**$ 154,611**	**$ 154,611**
	UNIV ERP	**$ 983,192**	**$ 983,192**
	BI Portals	**$ 34,960**	**$ 34,960**
	Personal Achievement Record	**$ 813,000**	**$ 813,000**
Total Training Costs		**$ 5,308,704**	**$ 5,308,704**
Total Estimated Internal IT Staffing Cost			**$ 3,729,582**
Total Project Management Cost			**$ 3,529,143**
Total Other Costs			**$ 12,567,429**
Total Software, Hardware, Implementation, and Other Costs			**$ 79,230,990**
Contingency Cost (10%)			$ 7,923,099.01
Total Quality Assurance Cost (6%)			**$ 4,753,859**
Total Estimated Project Costs			**$ 91,907,949**

Alternative 2.1:

Cost Categories & Sub Categories	Initial Cost	Maintenance & Warranty Cost						Total Cost
		Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost	Total Maintenance & Warranty Cost	
Hardware Costs								
Hardware Purchase, Configuration and Deployment								
K-12 SIS	$ 1,944,813							$ 1,944,813
K-12 ERP	$ 1,250,000							$ 1,250,000
OEIB SDW+P-20W SLDS	$ 210,000							$ 210,000
Portals	$ 57,000							$ 57,000
Personal Achievement Record	$ 48,000							$ 48,000
Total Hardware Costs								$ 3,509,813
Software costs								
Application Licenses								
K-12 SIS	$ 6,764,568	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 12,683,565	$ 19,448,133
K-12 ERP	$ 3,889,354	$ 908,215	$ 908,215	$ 908,215	$ 928,154	$ 955,999	$ 4,608,798	$ 8,498,152
OEIB SDW+P-20W SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
BI Portals	$ 87,000	$ 19,140	$ 19,140	$ 19,140	$ 19,140	$ 19,140	$ 95,700	$ 182,700
Total Application License Cost	$ 10,865,422	$ 3,482,743	$ 3,482,743	$ 3,482,743	$ 3,502,682	$ 3,530,527	$ 17,481,438	$ 28,346,860
Application Integration Tools (ETL Licenses, User Interface Portal Licenses) (if needed)								
OEIB SDW+P-20W SLDS	$ 521,098	$ 78,165	$ 78,165	$ 78,165	$ 78,165	$ 78,165	$ 390,824	$ 911,922
Total Application Integration License Costs	$ 521,098	$ 78,165	$ 78,165	$ 78,165	$ 78,165	$ 78,165	$ 390,824	$ 911,922
Database Licenses								
OEIB SDW+P-20W SLDS	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Database License Costs	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Software Cost	$ 11,586,520	$ 3,604,908	$ 3,604,908	$ 3,604,908	$ 3,624,847	$ 3,652,692	$ 18,092,262	$ 29,678,782

Alternative 2.1 (cont):

Implementation Costs			
Requirements, Process & Workflow Analysis			
	K-12 SIS	$ 187,200	$ 187,200
	K-12 ERP	$ 499,200	$ 499,200
	Portals	$ 249,600	$ 249,600
	OEIB P-20W SLDS	$ 130,700	$ 130,700
	Personal Achievement Record	$ 374,400	$ 374,400
Total Requirements, Process & Workflow Analysis Costs		$ 1,441,100	$ 1,441,100
System Design, Development & Testing			
	K-12 SIS	$ 1,127,428	$ 1,127,428
	K-12 ERP	$ 901,942	$ 901,942
	OEIB SDW+P-20W SLDS	$ 299,970	$ 299,970
	Portals	$ 163,620	$ 163,620
	Personal Achievement Record	$ 101,250	$ 101,250
Total System Design, Development and Testing Costs		$ 2,594,210	$ 2,594,210
ETL Design, Development & Testing			
	K-12 SIS	$ 67,500	$ 67,500
	K-12 ERP	$ 110,000	$ 110,000
	OEIB P-20W SLDS	$ 77,900	$ 77,900
Total ETL Design, Development & Testing		$ 255,400	$ 255,400
Systems Integration			
	K-12 SIS	$ 202,500	$ 202,500
	K-12 ERP	$ 202,500	$ 202,500
	ELDS+PRISM	$ 135,000	$ 135,000
Total System Integration Costs		$ 540,000	$ 540,000
Report Development including Customizations & Modifications			
	K-12 SIS	$ 250,000	$ 250,000
	K-12 ERP	$ 200,000	$ 200,000
	BI Portals	$ 121,500	$ 121,500
Total Cost for Report Development		$ 571,500	$ 571,500
Total Implementation Costs			$ 5,402,210
Other Costs			
Training & Training Materials			
	K-12 SIS	$ 845,571	$ 845,571
	K-12 ERP	$ 1,358,899	$ 1,358,899
	BI Portals	$ 34,960	$ 34,960
	Personal Achievement Record	$ 813,000	$ 813,000
Total Training Costs		$ 3,052,430	$ 3,052,430
Total Estimated Internal IT Staffing Cost			$ 3,729,582
Total Project Management Cost			$ 1,268,196
Total Other Costs			$ 8,050,208
Total Software, Hardware, Implementation, and Other Costs			$ 46,641,013
Contingency Cost (10%)			$ 4,664,101.31
Total Quality Assurance Cost (6%)			$ 2,798,461
Total Estimated Project Costs			$ 54,103,575

Alternative 2.2:

Cost Categories & Sub Categories	Initial Cost	Maintenance & Warranty Cost						Total Cost
		Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost	Total Maintenance & Warranty Cost	
Hardware Costs								
Hardware Purchase, Configuration and Deployment								
K-12 SIS	$ 1,944,813							$ 1,944,813
OEIB SDW+P-20W SLDS	$ 210,000							$ 210,000
Portals	$ 57,000							$ 57,000
Personal Achievement Record	$ 48,000							$ 48,000
Total Hardware Costs								$ 2,259,813
Software costs								
Application Licenses								
K-12 SIS	$ 6,764,568	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 2,536,713	$ 12,683,565	$ 19,448,133
OEIB SDW+P-20W SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
BI Portals	$ 87,000	$ 19,140	$ 19,140	$ 19,140	$ 19,140	$ 19,140	$ 95,700	$ 182,700
Total Application License Cost	$ 6,976,068	$ 2,574,528	$ 2,574,528	$ 2,574,528	$ 2,574,528	$ 2,574,528	$ 12,872,640	$ 19,848,708
Application Integration Tools (ETL Licenses, User Interface Portal Licenses) (if needed)								
OEIB SDW	$ 365,348	$ 54,802	$ 54,802	$ 54,802	$ 54,802	$ 54,802	$ 274,011	$ 639,359
Total Application Integration License Costs	$ 365,348	$ 54,802	$ 54,802	$ 54,802	$ 54,802	$ 54,802	$ 274,011	$ 639,359
Database Licenses (Estimated Cost of MS SQL database access for each application per estimated users)								
OEIB SDW+P-20W SLDS	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Database License Costs	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Software Cost	$ 7,541,416	$ 2,673,330	$ 2,673,330	$ 2,673,330	$ 2,673,330	$ 2,673,330	$ 13,366,651	$ 20,908,067

Alternative 2.2 (cont):

Implementation Costs			
Requirements, Process & Workflow Analysis			
	K-12 SIS	$ 187,200	$ 187,200
	OEIB P-20W SLDS	$ 124,500	$ 124,500
	Personal Achievement Record	$ 374,400	
Total Requirements, Process & Workflow Analysis Costs		$ 311,700	$ 311,700
System Design, Development & Testing			
	K-12 SIS	$ 1,127,428	$ 1,127,428
	OEIB SDW+P-20W SLDS	$ 299,970	$ 299,970
	Portals	$ 163,620	$ 163,620
	Personal Achievement Record	$ 101,250	$ 101,250
Total System Design, Development and Testing Costs		$ 1,692,268	$ 1,692,268
ETL Design, Development & Testing			
	K-12 SIS	$ 67,500	$ 67,500
	OEIB P-20W SLDS	$ 77,900	$ 77,900
Total ETL Design, Development & Testing		$ 145,400	$ 145,400
Systems Integration			
	K-12 SIS	$ 202,500	$ 202,500
	ELDS+PRISM	$ 135,000	$ 135,000
Total System Integration Costs		$ 337,500	$ 337,500
Report Development including Customizations & Modifications			
	K-12 SIS	$ 980,000	$ 980,000
	BI Portals	$ 121,500	$ 121,500
Total Cost for Report Development		$ 1,101,500	$ 1,101,500
Total Implementation Costs			$ 3,588,368
Other Costs			
Training & Training Materials			
	K-12 SIS	$ 845,571	$ 845,571
	BI Portals	$ 34,960	$ 34,960
	Personal Achievement Record	$ 813,000	$ 813,000
Total Training Costs		$ 1,693,531	$ 1,693,531
Total Estimated Internal IT Staffing Cost			$ 3,729,582
Project Management Costs			$ 792,285
Total Other Costs			$ 6,215,398
Total Software, Hardware, Implementation, Other Costs			$ 32,971,646
Contingency Cost (10%)			$ 3,297,164.62
Total Quality Assurance Cost (6%)			$ 1,978,299
Total Estimated Project Costs			$ 38,247,110

Alternative 3:

Cost Categories & Sub Categories	Initial Cost	Maintenance & Warranty Cost						Total Cost
		Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost	Total Maintenance & Warranty Cost	
Hardware Costs								
Hardware Purchase, Configuration and Deployment								
OEIB SDW+P-20W SLDS	$ 210,000							$ 210,000
Portals	$ 57,000							$ 57,000
Personal Achievement Record	$ 48,000							$ 48,000
Total Hardware Costs								**$ 315,000**
Software costs								
Application Licenses								
OEIB SDW+P-20W SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
BI Portals	$ 42,683	$ 6,402	$ 6,402	$ 6,402	$ 6,402	$ 6,402	$ 32,012	$ 74,695
Total Application License Cost	$ 167,183	$ 25,077	$ 25,077	$ 25,077	$ 25,077	$ 25,077	$ 125,387	$ 292,570
Application Integration Tools (ETL Licenses, User Interface Portal Licenses) (if needed)								
OEIB SDW+P-20W SLDS	$ 603,348	$ 90,502	$ 90,502	$ 90,502	$ 90,502	$ 90,502	$ 452,511	$ 1,055,859
Total Application Integration License Costs	$ 603,348	$ 90,502	$ 90,502	$ 90,502	$ 90,502	$ 90,502	$ 452,511	$ 1,055,859
Database Licenses (Estimated Cost of MS SQL database access for each application per estimated users)								
OEIB SDW+P-20W SLDS	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Database License Costs	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Software Cost	$ 970,531	$ 159,580	$ 159,580	$ 159,580	$ 159,580	$ 159,580	$ 797,898	$ 1,768,429

Alternative 3 (cont):

Implementation Costs			
Requirements, Process & Workflow Analysis			
	Portals	$ 249,600	$ 249,600
	OEIB P-20W SLDS	$ 135,870	$ 135,870
	Personal Achievement Record	$ 374,400	$ 374,400
Total Requirements, Process & Workflow Analysis		$ 759,870	$ 759,870
System Design, Development & Testing			
	OEIB SDW+P-20W SLDS	$ 79,300	$ 79,300
	Portals	$ 271,620	$ 271,620
	Personal Achievement Record	$ 101,250	$ 101,250
Total System Design, Development and Testing Costs		$ 452,170	$ 452,170
ETL Design, Development & Testing			
	OEIB P-20W SLDS	$ 796,500	$ 796,500
Total ETL Design, Development & Testing		$ 796,500	$ 796,500
Systems Integration			
	Existing Agency Data Warehouses	$ 324,000	$ 324,000
Total System Integration Costs		$ 324,000	$ 324,000
Report Development including Customizations & Modifications			
	BI Portals	$ 121,500	$ 121,500
Total Cost for Report Development		$ 121,500	$ 121,500
Total Implementation Costs			$ 2,454,040
Other Costs			
Training & Training Materials			
	BI Portals	$ 34,960	$ 34,960
	Personal Achievement Record	$ 813,000	$ 813,000
Total Training Costs		$ 847,960	$ 847,960
Total Estimated Internal IT staffing Cost			$ 3,729,582
Project Management Costs			$ 495,300
Total Other Costs			$ 5,072,842
Total Software, Hardware, Implementation, and Other Costs			$ 9,610,311
Contingency Cost (10%)			$ 961,031.13
Total Quality Assurance Cost (6%)			$ 576,619
Total Estimated Project Costs			$ 11,147,961

Alternative 4:

Cost Categories & Sub Categories	Initial Cost	Maintenance & Warranty Cost						Total Cost
		Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost	Total Maintenance & Warranty Cost	
Hardware Costs								
Hardware Purchase, Configuration and Deployment								
HECC DW+SLDS	$ 160,000							$ 160,000
BI Solution for HECC Staff	$ 42,000							$ 42,000
OEIB DW+ P-20W SLDS	$ 210,000							$ 210,000
OEIB P-20W BI Solution	$ 42,000							$ 42,000
Achievement Data Warehouse	$ 20,000							$ 20,000
Personal Achievement Record	$ 48,000							$ 48,000
Total Hardware Costs								**$ 522,000**
Software costs								
Application Licenses								
HECC DW+SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
BI Solution HECC DW	$ 66,000	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 66,000	$ 132,000
BI Solution ODE	$ 66,000	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 66,000	$ 132,000
OEIB DW+P -20W SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
Achievement Data Warehouse	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Personal Achievement Record	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Application License Cost	$ 381,000	$ 63,750	$ 63,750	$ 63,750	$ 63,750	$ 63,750	$ 318,750	$ 699,750
Application Integration Tools (ETL Licenses, User Interface Portal Licenses) (if needed)								
HECC DW+SLDS	$ 18,725	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ 14,044	$ 32,769
OEIB DW+SLDS	$ 18,725	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ 14,044	$ 32,769
Total Application Integration License Costs	$ 37,450	$ 5,618	$ 5,618	$ 5,618	$ 5,618	$ 5,618	$ 28,088	$ 65,538
Database Licenses (Estimated Cost of MS SQL database access for each application per estimated users)								
Database License fees	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Database License Costs	$ 200,000							$ 200,000
Total Software Cost	$ 618,450	$ 69,368	$ 69,368	$ 69,368	$ 69,368	$ 69,368	$ 346,838	$ 965,288

Alternative 4 (cont):

Implementation Costs				
Requirements, Process & Workflow Analysis				
	BI Solution for HECC DW	$ 43,150		$ 43,150
	BI Solution for ODE DW	$ 43,150		$ 43,150
	OEIB P-20W BI Solution	$ 96,300		$ 96,300
	Personal Achievement Record	$ 374,400		$ 374,400
Total Requirements, Process & Workflow Analysis Costs		$ 557,000		$ 557,000
System Design, Development & Testing				
	HECC DW+SLDS	$ 2,970		$ 2,970
	BI Solution for HECC DW	$ 57,240		$ 57,240
	BI Solution for ODE DW	$ 57,240		$ 57,240
	OEIB DW+P20W SLDS	$ 2,970		$ 2,970
	OEIB P-20W BI Solution	$ 57,600		$ 57,600
	Achievement Data Warehouse	$ 108,000		$ 108,000
	Personal Achievement Record	$ 101,250		$ 101,250
Total System Design, Development and Testing Costs		$ 387,270		$ 387,270
ETL Design, Development & Testing				
	BI Solution for HECC DW	$ 283,500		$ 283,500
	BI Solution for ODE DW	$ 283,500		$ 283,500
	OEIB P-20W BI Solution	$ 364,500		$ 364,500
Total ETL Design, Development & Testing		$ 931,500		$ 931,500
Systems Integration				
	Existing Agency Data Warehouses	$ 216,000		$ 216,000
Total System Integration Costs		$ 216,000		$ 216,000
Report Development including Customizations & Modifications				
	BI Solution for HECC DW	$ 40,000		$ 40,000
	BI Solution for ODE DW	$ 40,000		$ 40,000
	OEIB P-20W BI Solution	$ 40,000		$ 40,000
Total Cost for Report Development		$ 120,000		$ 120,000
Total Implementation Costs				$ 2,211,770
Other Costs				
Training & Training Materials				
	BI Solution for HECC DW	$ 42,920		$ 42,920
	BI Solution for ODE DW	$ 42,920		$ 42,920
	OEIB DW+ P20W SLDS	$ 85,840		$ 85,840
	OEIB P-20W BI Solution	$ 42,920		$ 42,920
	Personal Achievement Record	$ 813,000		$ 813,000
Total Training Costs		$ 1,027,600		$ 1,027,600
Total Estimated Internal IT Staffing Cost				$ 2,197,008
Project Management Costs				$ 485,906
Total Other Costs		$ 1,027,600		$ 3,710,514
Total Software, Hardware, Implementation, and Other Costs				$ 7,409,571
Contingency Cost (10%)				$ 740,957.10
Total Quality Assurance Cost (6%)				$ 444,574
Total Estimated Project Costs				$ 8,595,102

Alternative 5:

Cost Categories & Sub Categories		Initial Cost	Maintenance & Warranty Cost						Total Cost
			Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost	Total Maintenance & Warranty Cost	
Hardware Costs									
Hardware Purchase, Configuration and Deployment									
	HECC DW+SLDS	$ 160,000							$ 160,000
	BI Solution for HECC Staff	$ 42,000							$ 42,000
	OEIB DW+P20W SLDS	$ 210,000							$ 210,000
	OEIB P-20W BI Solution	$ 42,000							$ 42,000
Total Hardware Costs									$ 454,000
Software costs									
Application Licenses									
	HECC DW+SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
	BI Solution for HECC DW	$ 66,000	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 66,000	$ 132,000
	BI Solution for ODE DW	$ 66,000	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 13,200	$ 66,000	$ 132,000
	OEIB DW+ P20W SLDS	$ 124,500	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 18,675	$ 93,375	$ 217,875
	OEIB P-20W BI Solution	$ 42,683	$ 6,402	$ 6,402	$ 6,402	$ 6,402	$ 6,402	$ 32,012	$ 74,695
Total Application License Cost		$ 423,683	$ 70,152	$ 70,152	$ 70,152	$ 70,152	$ 70,152	$ 350,762	$ 774,445
Application Integration Tools (ETL Licenses, User Interface Portal Licenses) (if needed)									
	HECC DW+SLDS	$ 18,725	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ 14,044	$ 32,769
	OEIB DW+SLDS	$ 18,725	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ 2,809	$ -	$ -
Total Application Integration License Costs		$ 37,450	$ 5,618	$ 5,618	$ 5,618	$ 5,618	$ 5,618	$ 14,044	$ 32,769
Database Licenses (Estimated Cost of MS SQL database access for each application per estimated users)									
	Database License fees	$ 200,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 44,000	$ 220,000	$ 420,000
Total Database License Costs		$ 200,000							$ 200,000
Total Software Cost		$ 661,133	$ 75,770	$ 75,770	$ 75,770	$ 75,770	$ 75,770	$ 364,806	$ 1,007,214

Alternative 5 (cont):

Implementation Costs				
Requirements, Process & Workflow Analysis				
	BI Solution for HECC DW	$ 43,150		$ 43,150
	BI Solution for HECC DW	$ 43,150		$ 43,150
	OEIB P-20W BI Solution	$ 84,400		$ 84,400
Total Requirements, Process & Workflow Analysis Costs		$ 170,700		$ 170,700
System Design, Development & Testing				
	HECC DW+SLDS	$ 418,500		$ 418,500
	OEIB DW+SLDS	$ 189,000		$ 189,000
Total System Design, Development and Testing Costs		$ 607,500		$ 607,500
ETL Design, Development & Testing				
	BI Solution for HECC DW	$ 154,440		$ 154,440
	BI Solution for ODE DW	$ 154,440		$ 154,440
	OEIB P-20W BI Solution	$ 50,500		$ 50,500
Total ETL Design, Development & Testing		$ 359,380		$ 359,380
Systems Integration				
	Existing Agency Data Warehouses	$ 111,240		$ 111,240
Total System Integration Costs		$ 111,240		$ 111,240
Report Development including Customizations & Modifications				
	BI Solution for HECC DW	$ 40,000		$ 40,000
	BI Solution for ODE DW	$ 40,000		$ 40,000
	OEIB P-20W BI Solution	$ 40,000		$ 40,000
Total Cost for Report Development		$ 120,000		$ 120,000
Total Implementation Costs		$ 1,368,820		$ 1,368,820
Other Costs				
Training & Training Materials				
	BI Solution for HECC DW	$ 42,920		$ 42,920
	BI Solution for ODE DW	$ 42,920		$ 42,920
	OEIB DW+ P20W SLDS	$ 85,840		$ 85,840
	OEIB P-20W BI Solution	$ 42,920		$ 42,920
Total Training Costs		$ 214,600		$ 214,600
Total Estimated Internal IT Staffing Cost				$ 2,014,875
Project Management Costs				$ 237,513
Total Other Costs		$ 214,600		$ 2,466,988
Total Software, Hardware, Implementation, and Other Costs				$ 5,297,022
Contingency Cost (10%)				$ 529,702.20
Total Quality Assurance Cost (6%)				$ 317,821
Total Estimated Project Costs				$ 6,144,546

Appendix 4: Detailed Cost Assumptions

Cost Assumptions							
Assumption Category	**Description**	**Alt 1**	**Alt 2.1**	**Alt 2.2**	**Alt 3.0**	**Alt 4.0**	**Alt 5.0**
General Cost Assumptions	One time costs (initial cost) and recurring costs (maintenance and support costs for a period of five years) associated with each alternative were calculated based on the high-level assumptions described in the Alternative Analysis section of this Business Case.	✓	✓	✓	✓	✓	✓
General Cost Assumptions	This total cost of ownership analysis does not include local resource costs (school district and institutional level) associated with implementing each alternative. However, internal staffing costs associated with supporting implementation and on-going maintenance of the SLDS-P20W (for a 3-year period) is included in the analysis. It is assumed that some funds assigned to internal staffing may be allocated to secure contracting services for full-time positions.	✓	✓	✓	✓	✓	✓
General Cost Assumptions	This total cost of ownership analysis does not include financial, personal and other resources associated with supporting existing SLDS efforts including Project ALDER.	✓	✓	✓	✓	✓	✓
General Cost Assumptions	Failed assumptions on high-level alternative architecture and/or the development of detailed requirements at a future stage may significantly change the estimated costs. Once detailed technical and functional requirements, design layout and technical architecture have not been completed at this stage, and once they emerge, they may have some impact on the cost estimates.	✓	✓	✓	✓	✓	✓
General Cost Assumptions	The cost estimates are based on the assumption that there will be active participation and on-going commitment throughout the project from the various State stakeholders to ensure that the project is completed on-time.	✓	✓	✓	✓	✓	✓
General Cost Assumptions	Some PK systems may be created as part of the ELDS project under the umbrella of the Early Learning Hubs. Funds may have to be allocated separately outside the scope of this specific project for this effort.	✓	✓	✓	✓	✓	✓
General Cost Assumptions	The cost associated with establishing and maintaining data governance structure (including data ownership/stewardship partnerships) is not included in this analysis.	✓	✓	✓	✓	✓	✓

General Cost Assumptions	Additional funds may require to address enterprise storage impact (infrastructure and physical space) as DW matures over-time.	✓	✓	✓	✓	☐	☐
Hardware Cost Assumptions	The state has pricing structures with hardware vendors that may produce optimal pricing for hardware components such as servers.	✓	✓	✓	✓	✓	✓
Hardware Cost Assumptions	DW hardware costs includes clustered servers to offer 99% uptime. It is assumed that the OEIB SDW and the reporting engines would be required to be available 24x7.	✓	✓	✓	✓	☐	☐
Implementation Cost Assumption	It is an assumption that limited or no financial and HR information is captured by the existing agency (K12, CC, OUS) DWs. For reporting purposes, historical SIS and ERP system data needs to be extracted, transformed, and loaded into the OEIB SDW. It is assumed that historical SIS data may be readily available from agency DWs. However, required ERP (HR and financial) data may not be readily available and significant level of effort may be required to extract and transform data from the district/institutional level (197 K12 school districts, 17 CC, and 7 UNIV). However, the details of this are too abstract for any meaningful assumption to be made at this stage regarding the possible nature/number of sources of extraction of historical ERP data, which will be subsequently transformed and loaded into the OEIB SDW. The cost estimate for the ETL of historical ERP data may vary significantly when exact details emerge regarding the nature/number of extraction points for historical ERP data.	✓	✓	✓	✓		
Implementation Cost Assumption	It is an assumption that limited or no financial and HR information is captured by the existing regional DWs. Some, but not all, regional data warehouses may have financial, HR, teacher licensure information. For reporting purposes, historical SIS and ERP system data needs to be extracted, transformed, and loaded to the ODE and HECC DWs. It is assumed that historical SIS data is already available on agency DWs. However, ERP (HR and financial) data may not be readily available and may have to be extracted (and transformed) from district/institutional level (196 K12 school districts, 17 CC's, and 7 UNIV).					✓	✓
Implementation Cost Assumption	Data quality issues may exist in the regional data warehouses.					✓	✓
Implementation Cost Assumption	ETL Implementation costs is based on the assumption that the 3 primary SIS will be supported directly and other SIS will be supported with a templated approach.				✓	☐	☐
Implementation Cost	ETL Implementation costs is based on the assumption that the 3 primary ERP will be supported directly and other FMIS and HRIS will be supported			✓	✓	☐	☐

Assumption	with a templated approach.						
Implementation Cost Assumption	Migration of historical data from the existing K20 SIS and ERP systems is required to cater to P20W SLDS and PAR. Student data since 2004 and HR & financial data since 2000 will be migrated and made available for reporting from 196 K12 districts, 17 CC's and 7 UNIV. These assumptions have been factored into the cost estimates provided; however, the exact number of interfaces required to migrate this data may not be accurate and this may result in variances.	✓	✓	✓	✓		
Implementation Cost Assumption	K-12 school districts, community colleges and universities use multiple SIS & ERP systems that operate on diverse platforms. The exact extent of this diversity is not yet determined and it is therefore difficult to make accurate assumptions for the sake of cost estimates.		✓	✓	✓	✓	✓
Implementation Cost Assumption	It is assumed that interagency data uniformity does not exist (Data within each of the three sectors may be uniform within the sector). The K12 KIDS system, CC's OCCURS system, and the OUS' SCARF system have uniform data within their individual systems. Data linkage after identification and matching will have to be performed.	✓	✓	✓	✓	✓	✓
Implementation Cost Assumption	The interagency matching engine interfaces with the ODE DW and HECC DW to identify, match and link records and provide the P20W integrated view. The assumption is that the interagency matching engine will link P20W records across these two DWs.					✓	✓
Implementation Cost Assumption	This cost analysis assumes that the HECC will conform and merge the CC, OUS and other secondary institution data satisfactorily outside the scope of this project.					✓	✓
Implementation Cost Assumption	The Achievement Data Warehouse (ADW) interfaces with the ODE DW and HECC DW to gather the required information to present the PAR. This cost analysis assumes that agency DW's captures achievement data satisfactorily outside the scope of this project. The ADW requires to interface with these two DWs (only) to be able to gather and integrate all the information needed to constitute a PAR.					✓	
Implementation Cost Assumption	The scope of data to be included in the PAR is not clearly defined during the development of this Business Case. The assumption is the PAR is limited to a small record of data that captures student's information, and a RESTful web service is the best mechanism for integration of PAR data with other applications.	✓	✓	✓	✓	✓	

Implementation Cost Assumption	ODE/OEIB does not have a identity management system in place that may be utilized for providing SSO via directory services to provide access for clients (users) to the servers. The cost of implementing a new statewide Identity Management System is not a part of this cost analysis.	✓	✓	✓	✓	✓	✓
Software Cost Assumptions	Pricing is based on enterprise licensing to software, so a single license can cover all of a license holders deployments (multiple nodes in clusters and separate DEV, QA and PROD environments).	✓	✓	✓	✓	✓	✓
Software Cost Assumptions	This cost analysis assumes that existing institutional database licenses will offset the cost of purchasing the new licenses (200K standard licenses fee for additional users has been included in the estimates).	✓	✓	✓	✓	✓	✓
Software Cost Assumptions	It is assumed that MS SQL is the preferred platform of the ODE/OEIB.	✓	✓	✓	✓	✓	✓
Software Cost Assumptions	The estimated cost of the DW component(s) includes license pricing.	✓	✓	✓	✓	✓	✓
Software Cost Assumptions	Software cost projections for OEIB BI Solution is based on the following users: 1) 500 end-users 2) 50 active users (ad-hoc report writing)	✓	✓	✓	✓	✓	✓
Software Cost Assumptions	Software cost projections for ODE BI Solution is based on the following users: 1) 500 end-users 2) 10 active users (ad-hoc report writing)	□	□	□	□	✓	✓
Software Cost Assumptions	Software cost projections for HECC BI Solution is based on the following users: 1) 500 end-users 2) 10 active users (ad-hoc report writing)					✓	✓
Software Cost Assumptions	Software cost projections for OEIB SDW and SIS and ERP components is based on the following user base: 1. Number of users for student population. K-12: 563,714 CC: 146,216 UNIV: 03,074 2. Number of uses for parent population. K-12: 1,127,428 CC: 292,432 UNIV: 206,148 3. Number of users for staff/admin population. K-12: 41,000 CC: 10,000 UNIV: 5,000	✓	✓	✓	✓	□	□

Appendix 5: Detailed OEIB-SLDS Requirements

Need #	Need	Owner	Req. #	High Level Requirement	Priority	Category	Detailed Req. #	Detailed requirement
N1	User-friendly front-end	All	R1	The front end of an application must be easy to use i.e user-friendly.	1 Gotta have it. Requirement is critical to meet the stated need.	1	DR 1	Front end interface must be able to visually guide the user without formal training being provided.
							DR 2	front end interface must be mobile device capable
							DR 3	May be accessible on workstations (PC or MAC)
							DR 4	Must allow for access but no changing of the data on the screen
							DR 5	front end interface must have security if the user is reviewing student level data
							DR 6	Must be able to have the front end application presented in HTML 5
N2	OEIB outcomes Score Card	Policy Makers	R2	Must have metrics built to determine progress either postivie or negative by policy makers.	1 Gotta have it. Requirement is critical to meet the stated need.	1	DR 7	K-12 student level data on academic performance (grades, standardized tests, other assessments, graduation requirements), courses, attendance, membership in identified programs, disciplinary record, graduation status, and complete demographics.
							DR 8	School level data regarding teachers (licensure, years of experience, salary), budgeting (common chart of accounts) and demographics (school demographics include building configuration [k-5, k-8, 9-12, 7-12, etc], neighborhood data, age of the building, etc).
							DR 9	District level budget based on ODE Chart of Accounts

							DR 10	CC and University student level data on their courses, grades, graduation status, program of study, and demographics (includes SSN)
							DR 11	CC and University budget data.
							DR 12	Workforce (SSN, Employer, Quarterly Wage, Hire Date)
							DR 13	Early Learning Metrics: TBA. May include SSN
N3	Achievement compact results	Policy Makers	R3	Must be able to report on Achieve Compact results	1 Gotta have it. Requirement is critical to meet the stated need.	1	DR 14	Completion: Are students completing high school college and career ready?
							DR 15	Graduation Rate - Four-Year Cohort: The percent of students that earn a regular high school diploma within four years of first entering 9th grade.
							DR 16	Graduation Rate - Five-Year Cohort: The percent of students that earn a regular high school diploma within five years of first entering 9th grade.
							DR 17	5-Year Completion Rate - The percent of students who earned a regular diploma, modified diploma, extended diploma, adult high school diploma or GED within five years of entering high school. Calculated as the percent of students who earned such diploma or certificate within five years of entering 9th grade divided by the size of the cohort.

							DR 18	Post-Secondary Enrollment -Number of students enrolled in a post-secondary institution (community college, technical certificate program, or 4-year institution) within 16 months of high school completion. Defined as the number of graduates in a particular cohort that enroll in post secondary education divided by the number of completers in that cohort.
							DR 19	Progression: Sufficient progress toward college and career readiness
							DR 20	3rd Grade Proficiency - The percent of 3rd grade students who met or exceed in reading or math. Includes only those students enrolled on the first school day in May that have also been enrolled in the district for a full academic year.
							DR 21	6th Grade On Track - The percent of students who were present at least 90% of enrolled school days while enrolled in 6th grade (not chronically absent). Calculated as the number of students who are not chronically absent in 6th grade divided by the number of students enrolled in sixth grade. Includes only those students who have been enrolled in the district for a full academic year.

							DR 22	9th Grade on track - % of students who meet both of the following criteria: (1) have earned at least 6 credits on the date that is 12 months past first enrollment in 9th grade; and (2) present at least 90% of enrolled school days. Calculated as the number of students who meet both of these criteria within 12 months of first enrollment in 9th grade divided by the fall enrollment of first-time 9th graders. Includes only those students who have also been enrolled in the district for a full academic year.
							DR 23	Earning 9+ College Credits - % of students who have received 9 or more college credits while enrolled in high school or earlier. Credits can be earned through any means approved by local school board policy, including but not limited to AP exam, IB course completion, dual credit course completion, community college or university enrollment. Calculated as the percent of students who earned at least 9 college credits by the end of their fourth year in high school divided by the size of the cohort.
							DR 24	Equity: Are students succeeding across across all buildings and populations?
							DR 25	Priority / Focus Schools - For 2011-12 and earlier this is the count of schools on the federal title 1 school improvement list. For 2012-13 and later this will be the counts of priority and focus schools in the district

							DR 26	Disadvantaged Students - Disadvantaged student groups includes students who are: (1) economically disadvantaged; (2) limited English proficient; (3) students with disabilities; (4) Black (not of Hispanic origin); (5) Hispanic origin; (6) American Indian / Alaskan native; (7) Multi-racial / multi-ethnic.
							DR 27	Investment: What is the public investment in the district?
							DR 28	Formula Revenue, Local revenue not passed through formula, Federal revenue, and State grants not passed through formula - Detailed information regarding these funding sources can be found in the Oregon Department of Education Program Budgeting & Accounting Manual (PBAM), http://www.ode.state.or.us/search/page/?=1605
N4	Pre-processed data that is linked and de-identified	Policy Makers, Research Partners	R4	Must be able to create longitudinal records for students that are built from data collected by multiple sources	1 Gotta have it. Requirement is critical to meet the stated need.		DR 29	Must have a Matching Engine that can link student record data from multiple sources and create linked records. Engine must be modifiable by the user to allow for tuning to improve match rates.
N5	Need to have Ad-hoc reports	Policy Makers	R5	Must be able to produce and generate ad-hoc reports.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 30	Must have a Structured Query Language (SQL) based query and reporting tool.
N6	Achievement Compacts Analysis	OEIB	R6	Must be able to perform analysis on achievement compacts data.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 31	Must have a Structured Query Language (SQL) based query and reporting tool that exports data to other analytical software.

N7	Policy research tools	OEIB	R7	Must have policy research tools which enable analysis, reporting on a wide variety of data sets options.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 32	Must have Business Inteligence tools that allow for modeling, scenario builidng, and other analytical functions
N8	Outcome based budgeting tools	OEIB	R8	Must have outcome based budgeting tools,	1 Gotta have it. Requirement is critical to meet the stated need.		DR 32	
N9	Single approval process	Research Partners	R9	Must have a signle approval process for researchers to access data.	1 Gotta have it. Requirement is critical to meet the stated need.			
N10	Secure data	ALL	R10	Must have more secure data practices in place that meets or exceeds FERPA, HIPAA and other agency and system requirements.	1 Gotta have it. Requirement is critical to meet the stated need.			
N11	Efficient data transfer	Research Partners	R11	Must have more efficient data transfer processe				
N12	Data Warehouse	ODE, HECC, Pre-K-12	R12	Must have a data warehouse to collect all data needed to supply various requirements.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 33	For K-12, this includes student information collections defined by the ODE KIDS data dictionary; financial information collections defined by the State Chart of Accounts; and human resouces information as defined by the ODE educator collection

							DR 34	For Community Colleges, this includes student information collectiosn defined by the OCCURS data dictionary
							DR 35	For Public Universities, this includes student information collections defined by the SCARF data collection
N13	Inclusion of Early Learning Data from multiple agencies	ODE	R13	Must collect early learning data from multiple data sources.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 36	System must integrate with the work of the Early Learning Commission data warehouse program development.
N14	Early Learning through 12 (pre-K - 12) Longitudinal data	ODE	R14	Must have a longitudinal database to collect early learning through grade 12.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 33	For K-12, this includes student information collections defined by the ODE KIDS data dictionary; financial information collections defined by the State Chart of Accounts; and human resouces information as defined by the ODE educator collection
N15	Achievement Compact input system	ODE, HECC	R15	Must have an achievement compact reporting system.	1 Gotta have it. Requirement is critical to meet the stated need.			
N16	Post-secondary and employment pathways longitudinal batabase	HECC	R16	Must have an efficient data transfer process from post-secondary data sources and employment pathways to populate a longitudinal database.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 34	Must house and maintain student-record data from multile agencies and link that record data.
							DR 35	Must provide a two-way exchange of information between the HECC and the Oregon Employment department.

							DR 36	Must provide a matching function to create longitudinal records of student attenance in community college, university, other educational opportunities, and/or the workforce
N17	Student Information System	K-12, Colleges, Universities		Must have a student information system that supplies the required data fields into the ODE and HECC	2. Nice to have, adds value			
N18	Financial Information System	K-12, Colleges, Universities		Must have a financial information system that supplies the required data to ODE and HECC	3. Optional, maybe good for an enhancement later.			
N19	Human Resource Information System	K-12, Colleges, Universities		Must have a human resource system that provides the required data to ODE and HECC	3. Optional, maybe good for an enhancement later.			
N20	Early Warning System	K-12		Must provide notice of students being off-track to graduate in a consistent way to all instructional staff	2. Nice to have, adds value			
N21	College and Career Readiness Indicators	K-12		Must provide students with feedback on whether they are on track for their college and career goals	1 Gotta have it. Requirement is critical to meet the stated need.			

N22	Meaningful Achievement Compact Reports	K-12, Colleges, Universities		Must provide institutions with reports that show compact goals and progress toward meeting those goals.	1 Gotta have it. Requirement is critical to meet the stated need.			
N23	Automatic Reporting Systems	K-12, Colleges, Universities		Must provide a method of automatically extracting compact data from district or agency data systems.	2. Nice to have, adds value			
N24	Electronic Access to student record	Parents, Students		Must provide a method for families and students to view their educational achievements on-line.	1 Gotta have it. Requirement is critical to meet the stated need.		DR 37	Must provide users with the student's transcript of grades in all public education settings.
							DR 38	Must provide users with a repository for storing a collection of evidence of achievement. This collection will allow for the uploading of documents.
							DR 39	Must provice user with a repositiory for storing proficiency information
							DR 40	Must provide user with a repository for storing evidence of prior experience
N25	Tools and applications for understanding their data	Parents, Students		Must provide reportss that allows for users examine their data graphically	1 Gotta have it. Requirement is critical to meet the stated need.			

N26	School and career planning tools	Parents, Students		Must provide users with goal setting tools that give the user feedback	1 Gotta have it. Requirement is critical to meet the stated need.		DR 41	Must meet the standards required by the Oregon Diploma's Student Plan and Profile
							DR 42	Must include a developmentally appropriate interest inventories that give feedback to students
							DR 43	Must provide a developmentally appropriate career exploration application that gives feedback to students
N27	Ability to share information with schools and employers	Parents, Students		Must allow tudents to select to send all or parts of their educational record information to educational institutions and employeers.	2. Nice to have, adds value		DR 44	The educational record reports will be PDF documents that specify the achievement and the granting institution.
N28	Tools to imporve instruction	Schools & Agency Staff		Must provide teachers and other instructional staff information on how students respond over time to interventions	2. Nice to have, adds value			
N29	Reduce or not increase workload	Schools & Agency Staff		Must not increase the amount of reporting required by instructional staff to populate the SLDS	1 Gotta have it. Requirement is critical to meet the stated need.			

Appendix 6: OEIB-SLDS Project Definitions and Acronyms List

AEC	ALDER Executive Committee
ALDER	Advancing Longitudinal Data for Educational Reform
ARRA	American Recovery and Reinvestment Act
BI	business intelligence
CCWD	Community College and Workforce Development
CORE	interagency Operational Data Store
CSDQP	Comprehensive Statewide Data Quality Plan
DAS	Department of Administrative Services
DHS	Department of Human Services
DQC	Data Quality Campaign
DWGC	Data Warehouse Governance Committee
ELC	Early Learning Commission
EI/ECSE	Early Intervention/Early Childhood Special Education programs
ELD	Early Learning Division (of Oregon Dept. of Education)
ELDS	Early Learning Data System
ELL	English Language Learner
EPIC	Educational Policy Improvement Center
ERP	Enterprise Resource Planning
ETL	Extract, Transfer, Load
FERPA	The Family Education Rights and Privacy Act
GOLD	
HECC	Higher Education Coordinating Commission
IEP	Individual Education Plan
KIDS	K-12 Integrated Data System
LFO	Legislative Financial Office
OCCURS	Oregon Community College Unified Reporting System
ODE	Oregon Department of Education
OED	Oregon Employment Department
OEIB	Oregon Education Investment Board
OEIB-SLDS	Student Longitudinal Database System for P-20W Education
OHA	Oregon Health Authority
OHS PreK	Oregon Head Start Prekindergarten
OSTX	Oregon Student Transcript Exchange - electronic student record exchange system
OUS	Oregon University System
OYA	Oregon Youth Authority
P-20	All Oregonians from birth through graduate school
P-20W	All Oregonians from birth through graduate school and the workforce
PAR	Personal Achievement Record
PRISM	Performance Reporting Information System (Oregon Employment Department)
RAC	Regional Achievement Collaborative
RFP	Request for Proposal
SAC	Student Assistance Commission
SBE	School Boards of Education
SCARF	Student Centralized Administrative Reporting File
SLDS	State Longitudinal Data System
SIS	Student Information Systems/New School Information System

SSIS	Statewide Student Information Systems
TAG	Talented and gifted
TSPC	Teacher's Standards and Practices Commission
USDE	United States Department of Education
WICHE	Western Interstate Commission for Higher Education
YDC	Oregon Youth Development Council

Appendix 7: Research Relevant to Personal Achievement Record

Excerpts from a presentation by Laura McCoid, Director of Oregon CIS entitled, "Student Engagement and Relevant Career Information Connections"

Studies have consistently found that student career exploration can have a positive effect on school engagement and reduce dropout rates (Castellano, Stringfield, & Stone, 2003; Plank, 2001; Kenny, Blustein, Hasse, Jackson, & Perry, 2006).

The major reason students drop out of high school is they do not see relevance**.** (Kenny 2006, Pathways to Prosperity.)

Students at risk, girls, and minority students often limit their career choices early (O'Brien et al. 1999).

Students who view their education as relevant and intentional in preparing them to achieve future goals are more likely to perform well in school and graduate (Perry, 2008)

Students who can fit attending school within a long-term career narrative [goals] are more likely to remain engaged; technologically-supported tools can provide cost-effective and student-centers ways of doing this (Gore et al., 2006).

Students that recognize links between what they are learning in school and career and work opportunities after high school are more likely to complete classwork and build a positive mental image of their future (Hoyt 2005).

Motivation and engagement are enhanced where students develop education and career pathways. (Christenson, et al., 2008; National Research Council 2004)

Middle school students involved in career-relevant instruction in context of state-required course content had significantly higher levels of school engagement and valuing (Orthner, Johnes-Sanpei, Akos, & Rose, 2013).

Student behavioral and psychosocial levels of engagement decline significantly during middle school and in the transition to high school (Orthner et al., 2010; Woolley & Bowen, 2007)

Eighty-one percent of individuals who had dropped out indicated that if the schools had provided more real-world and work-related learning, it would have improved their chances of graduating from high school (Bridgeland et al., 2006).

While students have high expectations for education and careers, many have not developed coherent plans for achieving their goals (Schneider & Stevenson 1999).

Few middle school students have realistic career plans and many lack awareness of the world of work (Finch & Mooney 1997).

Students have a shallow understanding of how school relates to work, and have a limited awareness of the skills and knowledge needed for work (Johnson 2000).

Appendix 8: State Economic Benefits for Possible Educational Outcomes

From: Investing in Kids: Early Childhood Programs and Local Economic Development, Timothy Bartik, 2011

Table 12.1 Summary of State Economic Development Benefits of Possible Outcomes of Human Development Programs

Area	Change considered for one person	Present value of effect on earnings (in dollars)	Societal change considered	Long-run effects as % of state earnings
Elementary test scores	Increase by 0.1 effect size	8,312	All students increase by 0.1 effect size	1.08
Secondary test scores	Increase by 0.1 effect size	7,050	All students increase by 0.1 effect size	0.83
High school dropout	HS dropout to grad	175,234	Increase HS grads by 1% of population	0.21
Bachelor's degree	HS grad to bachelor's degree	375,912	Increase bachelor's degrees by 1% of population	0.45
Associate's degree	HS grad to associate's degree	126,995	Increase associate's degrees by 1% of population	0.15
Low birth weight	Improve one low-birth-weight baby to normal weight	135,631	Reduce incidence of low-birth-weight babies by 1% of population	0.17
ADHD	Prevent one case of multiple-age-period ADHD	31,123	Reduce incidence of multiple-age-period ADHD by 1% of population	0.04
Mental illness, drug or alcohol problems	Prevent negative earnings effects from one case of severe mental illness, or serious alcohol and drug problems	91,394	Reduce negative earnings effects of mental illness, or serious alcohol or drug problems, by 1% of population	0.10
Crime	Reduce probability of crime and imprisonment by 10%	1,189	Reduce crime and imprisonment by 10%	0.14

NOTE: This table focuses on state economic development benefits of specific changes in different human development outcomes, either for one person or for the aggregate population. All estimates are net effects on state residents' earnings. The dollar effects of changes for one person are the resulting net increase in earnings in this state associated with that one person's changed outcomes, calculated in present value terms using a discount rate of 3%, and discounted back to the age at which the change was initiated. The percentage effects of a society-wide change in outcomes are long-run percentage effects on state residents' earnings. All estimates adjust for mortality, out-migration, and displacement effects. Where plausible, estimates also adjust for positive peer effects.

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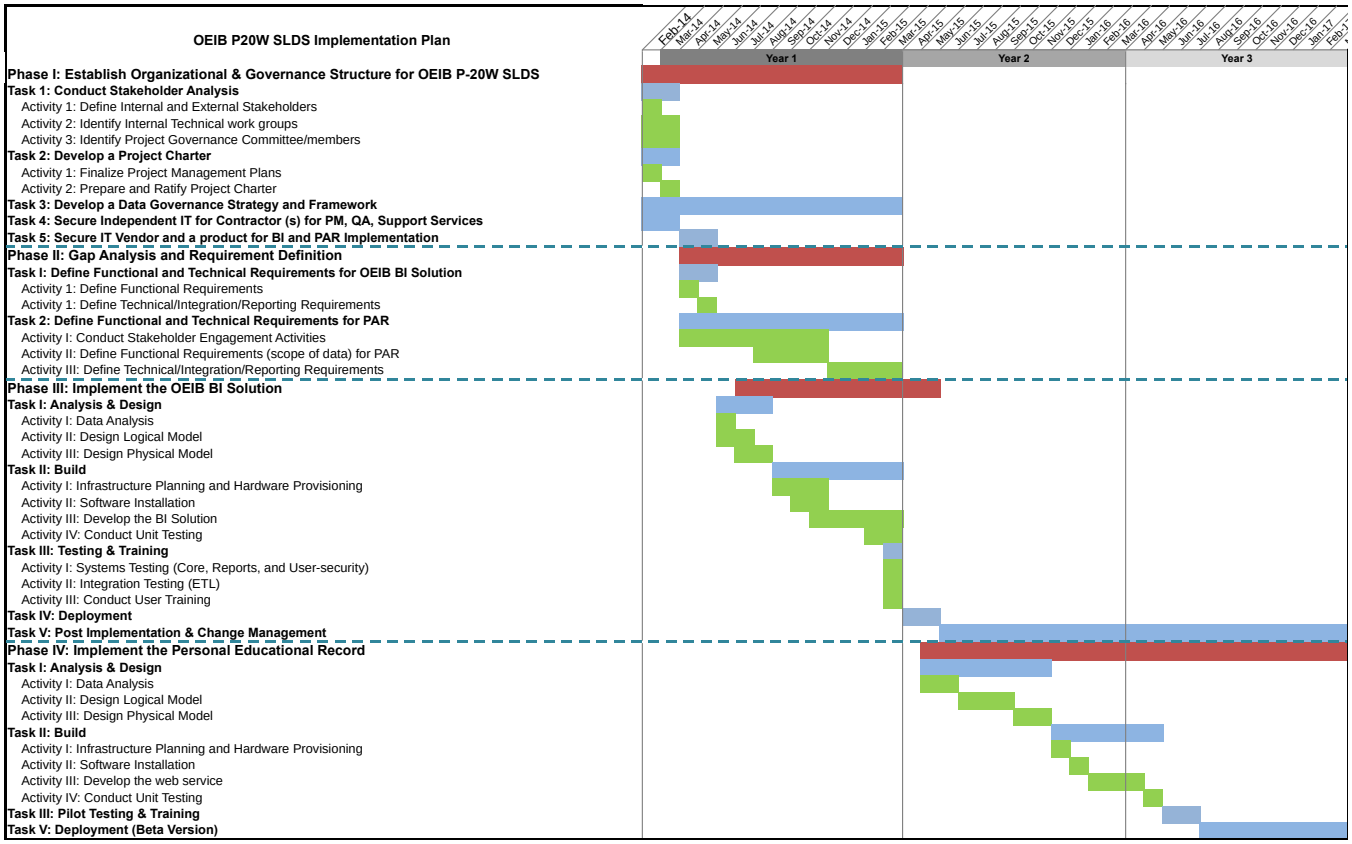
Appendix 9: Project Schedule

This chart is taken from OEIB-SLDS-P20WProjMgmtPlanV7-4.docx



Appendix 10: Spend Plan

This three year spend plan is derived from the current project management plan (OEIB-SLDS-P20WProjMgmtPlan), the cost estimates and other industry information from RNR consulting, and the current state of on-going expenditures at ODE, OEIB, and HECC. The spend plan defines a rapid ramp up of the project from the official start date. In the first year, 41% of the funds will be spent. This reflects initial costs of software and hardware. In year 2, 29% will be spent and in year 3, 30% will be spent. Beyond three years, the OEIB or HECC will be responsible for ongoing maintenance of the system (HECC ownership is the OEIB sunset provision).

Once the decision is made to fund this project and before funds arrive at the disposal of the OEIB, the Project Team will begin in-kind activities that will allow for the rapid project ramp up. Those activities include:

- Quality Assurance – draft statement of work, vet with DAS, solicit responses, evaluate and choose QA vendor, negotiate and execute QA contract – begin QA activities. Estimate 3 months – 12 state resources.

- Risk Assessment – perform internal review using DAS Self-Risk Assessment tool. Move forward with draft.

- Security Risk Assessment Review (draft is developed, vet with ESO for comments, send to three qualified vendors and obtain responses, evaluate and choose RA vendor, negotiate and execute RA contract – begin RA activities. Estimate 2 months – draft of SOW is completed.

- Evaluate what MOU's OEIB might need with respect to data sharing with other agencies. Ensure all ALDER MOU's are in place and extended past 6/30/2014 due to dependency of OEIB.

- Refine existing budget with OFA, LFO, DAS.

- Refine all project management materials with the selected alternative, change charter, project plan, risk, procurement, etc. Estimate for full vetting and approval 1 month – 10 resources from the state – PM, reviewers, and Governor's office.

These preparatory activities will be funded from the remaining resources provided in SB 5518A.

Spend Plan Months 1 – 6

Month	1	2	3	4	5	6
Total Hardware Costs	$0	$0	$0	$0	$0	$522,000
Total Software Cost	$57,318	$57,318	$573,181	$0	$0	$0
Total Requirements, Process & Workflow Analysis Costs	$15,472	$15,472	$15,472	$15,472	$15,472	$15,472
Total System Design, Development and Testing Costs	$10,758	$10,758	$10,758	$10,758	$10,758	$10,758
Total ETL Design, Development & Testing	$25,875	$25,875	$25,875	$25,875	$25,875	$25,875
Total System Integration Costs	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Total Cost for Report Development	$3,333	$3,333	$3,333	$3,333	$3,333	$3,333
Total Training Costs	$5,961	$5,961	$5,961	$5,961	$5,961	$5,961
Personal Achievement Record	$8,333	$8,333	$8,333	$8,333	$8,333	$8,333
IT Support Staff or Services	$61,028	$61,028	$61,028	$61,028	$61,028	$61,028
Project Management	$13,497	$13,497	$13,497	$13,497	$13,497	$13,497
Contingency	$20,582	$20,582	$20,582	$20,582	$20,582	$20,582
Total Quality Assurance	$18,524	$18,524	$18,524	$18,524	$18,524	$18,524
Monthly/Yearly Total	$246,682	$246,682	$762,545	$189,364	$189,364	$711,364
Cumulative Total	$246,682	$493,364	$1,255,909	$1,445,273	$1,634,637	$2,346,001

Spend Plan Months 7-12

Month	7	8	9	10	11	12	Year One Totals
Total Hardware Costs	$0	$0	$0	$0	$0	$0	$522,000
Total Software Cost	$0	$0	$0	$0	$0	$0	$687,818
Total Requirements, Process & Workflow Analysis Costs	$15,472	$15,472	$15,472	$15,472	$15,472	$15,472	$185,667
Total System Design, Development and Testing Costs	$10,758	$10,758	$10,758	$10,758	$10,758	$10,758	$129,090
Total ETL Design, Development & Testing	$25,875	$25,875	$25,875	$25,875	$25,875	$25,875	$310,500
Total System Integration Costs	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$72,000
Total Cost for Report Development	$3,333	$3,333	$3,333	$3,333	$3,333	$3,333	$40,000
Total Training Costs	$5,961	$5,961	$5,961	$5,961	$5,961	$5,961	$71,533
Personal Achievement Record	$8,333	$8,333	$8,333	$8,333	$8,333	$8,333	$100,000
IT Support Staff or Services	$61,028	$61,028	$61,028	$61,028	$61,028	$61,028	$732,336
Project Management	$13,497	$13,497	$13,497	$13,497	$13,497	$13,497	$161,969
Contingency	$20,582	$20,582	$20,582	$20,582	$20,582	$20,582	$246,986
Total Quality Assurance	$18,524	$18,524	$18,524	$18,524	$18,524	$18,524	$222,287
Monthly/Yearly Total	$189,364	$189,364	$189,364	$189,364	$189,364	$189,364	$3,482,185
Cumulative Total	$2,535,365	$2,724,729	$2,914,093	$3,103,457	$3,292,821	$3,482,185	

Spend Plan Months 13 – 18

Month	13	14	15	16	17	18
Total Hardware Costs	$0	$0	$0	$0	$0	$0
Total Software Cost	$0	$0	$138,735	$0	$0	$0
Total Requirements, Process & Workflow Analysis Costs	$15,472	$15,472	$15,472	$15,472	$15,472	$15,472
Total System Design, Development and Testing Costs	$10,758	$10,758	$10,758	$10,758	$10,758	$10,758
Total ETL Design, Development & Testing	$25,875	$25,875	$25,875	$25,875	$25,875	$25,875
Total System Integration Costs	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Total Cost for Report Development	$3,333	$3,333	$3,333	$3,333	$3,333	$3,333
Total Training Costs	$5,961	$5,961	$5,961	$5,961	$5,961	$5,961
Personal Achievement Record	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
IT Support Staff or Services	$61,028	$61,028	$61,028	$61,028	$61,028	$61,028
Project Management	$13,497	$13,497	$13,497	$13,497	$13,497	$13,497
Contingency	$20,582	$20,582	$20,582	$20,582	$20,582	$20,582
Total Quality Assurance	$9,262	$9,262	$9,262	$9,262	$9,262	$9,262
Monthly/Yearly Total	$196,769	$196,769	$335,504	$196,769	$196,769	$196,769
Cumulative Total	$3,678,953	$3,875,722	$4,211,226	$4,407,994	$4,604,763	$4,801,532

Spend Plan – Months 19 - 24

Month	19	20	21	22	23	24	Year Two Totals
Total Hardware Costs	$0	$0	$0	$0	$0	$0	$0
Total Software Cost	$0	$0	$0	$0	$0	$0	$138,735
Total Requirements, Process & Workflow Analysis Costs	$15,472	$15,472	$15,472	$15,472	$15,472	$15,472	$185,667
Total System Design, Development and Testing Costs	$10,758	$10,758	$10,758	$10,758	$10,758	$10,758	$129,090
Total ETL Design, Development & Testing	$25,875	$25,875	$25,875	$25,875	$25,875	$25,875	$310,500
Total System Integration Costs	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$72,000
Total Cost for Report Development	$3,333	$3,333	$3,333	$3,333	$3,333	$3,333	$40,000
Total Training Costs	$5,961	$5,961	$5,961	$5,961	$5,961	$5,961	$71,533
Personal Achievement Record	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$300,000
IT Support Staff or Services	$61,028	$61,028	$61,028	$61,028	$61,028	$61,028	$732,336
Project Management	$13,497	$13,497	$13,497	$13,497	$13,497	$13,497	$161,969
Contingency	$20,582	$20,582	$20,582	$20,582	$20,582	$20,582	$246,986
Total Quality Assurance	$9,262	$9,262	$9,262	$9,262	$9,262	$9,262	$111,144
Monthly/Yearly Total	$196,769	$196,769	$196,769	$196,769	$196,769	$196,769	$2,499,959
Cumulative Total	$4,998,300	$5,195,069	$5,391,838	$5,588,606	$5,785,375	$5,982,144	

Spend Plan – Months 25 – 30

Month	25	26	27	28	29	30
Total Hardware Costs	$0	$0	$0	$0	$0	$0
Total Software Cost	$0	$0	$138,735	$0	$0	$0
Total Requirements, Process & Workflow Analysis Costs	$15,472	$15,472	$15,472	$15,472	$15,472	$15,472
Total System Design, Development and Testing Costs	$10,758	$10,758	$10,758	$10,758	$10,758	$10,758
Total ETL Design, Development & Testing	$25,875	$25,875	$25,875	$25,875	$25,875	$25,875
Total System Integration Costs	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000
Total Cost for Report Development	$3,333	$3,333	$3,333	$3,333	$3,333	$3,333
Total Training Costs	$5,961	$5,961	$5,961	$5,961	$5,961	$5,961
Personal Achievement Record	$34,417	$34,417	$34,417	$34,417	$34,417	$34,417
IT Support Staff or Services	$61,028	$61,028	$61,028	$61,028	$61,028	$61,028
Project Management	$13,497	$13,497	$13,497	$13,497	$13,497	$13,497
Contingency	$20,582	$20,582	$20,582	$20,582	$20,582	$20,582
Total Quality Assurance	$9,262	$9,262	$9,262	$9,262	$9,262	$9,262
Monthly/Yearly Total	$206,185	$206,185	$344,920	$206,185	$206,185	$206,185
Cumulative Total	$6,188,329	$6,394,514	$6,739,435	$6,945,620	$7,151,805	$7,357,990

Spend Plan – Months 31 – 36

Month	31	32	33	34	35	36	Year Three Totals
Total Hardware Costs	$0	$0	$0	$0	$0	$0	$0
Total Software Cost	$0	$0	$0	$0	$0	$0	$138,735
Total Requirements, Process & Workflow Analysis Costs	$15,472	$15,472	$15,472	$15,472	$15,472	$15,472	$185,667
Total System Design, Development and Testing Costs	$10,758	$10,758	$10,758	$10,758	$10,758	$10,758	$129,090
Total ETL Design, Development & Testing	$25,875	$25,875	$25,875	$25,875	$25,875	$25,875	$310,500
Total System Integration Costs	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$72,000
Total Cost for Report Development	$3,333	$3,333	$3,333	$3,333	$3,333	$3,333	$40,000
Total Training Costs	$5,961	$5,961	$5,961	$5,961	$5,961	$5,961	$71,533
Personal Achievement Record	$34,417	$34,417	$34,417	$34,417	$34,417	$34,417	$413,000
IT Support Staff or Services	$61,028	$61,028	$61,028	$61,028	$61,028	$61,028	$732,336
Project Management	$13,497	$13,497	$13,497	$13,497	$13,497	$13,497	$161,969
Contingency	$20,582	$20,582	$20,582	$20,582	$20,582	$20,582	$246,986
Total Quality Assurance	$9,262	$9,262	$9,262	$9,262	$9,262	$9,262	$111,144
Monthly/Yearly Total	$206,185	$206,185	$206,185	$206,185	$206,185	$206,185	$2,612,959
Cumulative Total	$7,564,176	$7,770,361	$7,976,546	$8,182,732	$8,388,917	$8,595,102	