Alaska Policy Forum Report

A Critical Review of the Crime Laboratory Replacement Project

by

Chris W. Beheim and Ray Kreig

March 15, 2010

Existing

Proposed

ABOUT ALASKA POLICY FORUM

Vision: The Alaska Policy Forum will be the primary resource for credible authoritative Alaska policy research and education from a free-market perspective.

Mission: APF pursues this vision by conducting timely, relevant and accurate research and providing free market, Alaskan solutions in the most effective means possible to policymakers at the state and local level.

- We believe that individual freedom and private property are inextricably linked.
- We believe that government should be limited, transparent and accountable.
- We believe in responsible, sustainable development.
- We believe that free markets offer better solutions than government planning.

Alaska Policy Forum
201 Barrow Street #8
Anchorage, Alaska 99501
907.334.5853 - info@alaskapolicyforum.org
www.alaskapolicyforum.org

This report is available at:
www.alaskapolicyforum.org/pubs/CrimeLab.pdf

A Critical Review of the Crime Laboratory Replacement Project

By Chris W. Beheim and Ray Kreig, P.E.

Chris Beheim retired in 2007 as director of the Alaska Scientific Crime Detection Laboratory. He was the first forensic chemist hired by the State and worked as a supervisor in the crime lab for 28 years.

Ray Kreig is an Anchorage civil engineer with experience evaluating large capital projects. He has been president of Chugach Electric Association and was a member of the Design Competition Jury for the Anchorage Headquarters (Loussac) Library.

FINDINGS:

1. The State of Alaska is at risk of misusing millions of dollars if it approves the proposal to build a partially finished 84,400-square-foot new crime lab.

2. The case for this project has not been made; it is not fiscally responsible; and it is not the best use of Alaska's public resources.

3. At a minimum, the project should be postponed until it can be reassessed from the perspective discussed below and throughout this report.

4. Technological advancements will make large portions of the proposed lab obsolete within a decade.

5. Many legislators had substantial concerns over the cost and size of the new laboratory when it was proposed in 2008. Nonetheless, $12 million was appropriated for design and site preparation.

6. This will be a burden for Alaska's future generations to pay. The $75.75 million appropriation presented to the legislature is not representative of the true cost of this project. The building's extensive unfinished "shell" space will require an additional $21 million or more to finish it. Furthermore, the Department of Public Safety has poorly addressed how the building's operational cost will increase over the next 40 years.

RECOMMENDATIONS:

1. Suspend further work on the crime lab project until the following recommendations are completed.
2. The Legislature should perform an independent assessment study to determine the forensic science needs of the state.
3. Perform a detailed cost-benefit analysis to determine if adding the examination of seldom-encountered types of evidence to the laboratory's capabilities is justified.
4. Perform an expert management review. This should include process mapping, benchmarking, and adopting best practices to increase efficiencies.
5. Carefully consider cost-effective utilization of functional parts of the existing laboratory rather than duplicating them in a new facility.
6. Use the State Public Health Laboratory to perform forensic toxicology rather than building duplicate lab space.
7. Perform a detailed cost analysis of typing DNA database samples in-house vs. outsourcing to an FBI-approved private laboratory.
8. Perform an expert review of new technology trends in the forensic sciences. The need for vast quantities of centralized lab space will be eliminated as the FBI's integrated DNA "Laboratory in a Box" technology emerges within the next five to ten years. This will enable the testing of DNA database samples in police stations and jails.
9. Consider decentralizing Alaska's forensic science support by stationing crime-scene technicians throughout the state. They will aid law enforcement in the timely collection of critical evidence such as fingerprints and DNA that is easily lost or overlooked.
10. Return the proposed building site to the Municipality of Anchorage if the current project is abandoned. Under the provisions of the lease, the state could be reimbursed for the market value of the land and its wetland site improvements of $8 million.
11. Post justifications and plans for all large capital projects on a government website so that taxpayers and experts can address issues and make informed comments to state officials and legislators.

SUMMARY:

The Department of Public Safety is requesting an additional $75.75 million to construct a new $93 million crime laboratory that will only be partially finished. Because it is likely that federal funding is not available for this project, the burden of paying for it will be placed 100% on Alaskan taxpayers.

To put this request into perspective, we surveyed the price, square footage, staffing, and caseload of recently constructed crime laboratories around the United States. We assessed rapidly developing trends in crime detection technologies to determine their potential impact on future lab requirements. Finally, we evaluated the needs assessment documents used to justify the project, the site selection process, and the construction documents. Throughout this process, the Department of Public Safety was often slow or nonresponsive to our requests for information.

We found the needs assessment document to be flawed. It did not consider options to reduce cost and did not perform a detailed cost/benefit analysis before designing laboratory space. In addition, it emphasized the need to construct large areas for analyzing rarely encountered evidence types that should be sent to forensic experts outside of Alaska who routinely examine such evidence. We found that the Department of Public Safety did not consider lab sizing and design in light of rapidly emerging DNA analysis technologies that will render large portions of the new facility unnecessary in only a few years. We found the construction plans to be extravagant with nonessential architectural components adding substantial cost to the project. The decision to build the laboratory on an oversized 15.5-acre wetland-affected parcel appears to be a mistake. We found that there were more reasonably sized suitable building sites available near the existing laboratory that would not have required wetland mitigation. With this in mind, we believe the proposed laboratory is far larger and more expensive than what is needed to provide high quality forensic science support for Alaska's limited population.

The $75.75 million appropriation presented to the legislature is not representative of the true cost of this project. The building's extensive unfinished "shell" space will require an additional $21 million or more to finish it. Furthermore, the Department of Public Safety has not adequately addressed how the building's operational cost will increase over the next 40 years. As with all large capital projects, the proposed lab will have high annual costs associated with its maintenance, utilities and staffing. Alaska's current crime laboratory needs additional space, but any expansion should be done in a manner that is well planned and fiscally responsible. Resources saved in reducing the size and cost of this project could be used to fund other law enforcement needs.

Abandonment of this project does not necessarily equate to a loss of the $16.8 million already spent. Half of that money has been allotted towards improving the intended centrally located 15.5-acre site. The site could be reused for an alternative project or could be returned to the Municipality of Anchorage. Under the provisions of the lease agreement with the Municipality of Anchorage, the State could be reimbursed for the market value of the land and its wetland improvements of $8 million[1].

Throughout the process of following this project, we have observed a lack of transparency. In 2006, the legislature approved $4.8 million to design a 38,000-square-foot laboratory. The Anchorage architectural firm selected to design this facility was allowed to subcontract with a consultant who recommended more than doubling the size of the project. When the expanded project was brought before the legislature in 2008, many legislators had substantial concerns over its cost and size. Nonetheless, $12 million was appropriated at the end of the session for design and site preparation before construction funding was secured.

Background

The Alaska Scientific Crime Detection Laboratory has a long history of providing high quality forensic science support to law enforcement agencies throughout the state. Accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) since 1996, the laboratory has gained a reputation of excellence. Crime laboratory personnel have been invited to make presentations at numerous national and international forensic science conferences, and have participated as active members in organizations that are the responsibility for setting forensic science standards and guidelines. Crime Laboratory personnel have also served in leadership roles in national and international forensic science organizations.

Prior to 1978, the State of Alaska's forensic science capability was limited to fingerprint identification. Drug evidence and toxicology samples were analyzed in private laboratories located in Anchorage, and other evidence types were shipped to the FBI Laboratory in Washington, DC for examination. The State's first laboratory was established in the basement of Alaska State Troopers' Anchorage headquarters building, and in 1986, the existing crime laboratory was opened.

In FY 2006, the Department of Public Safety sought federal funds to expand the crime lab by 6,000 square feet to meet future demands.[2] In FY 2008, the Department of Public Safety requested and received $4.8 million dollars for design of a new 38,000 square foot facility.[3] Under the previous administration, the proposed laboratory more than doubled in size and the cost of the project soared to over $100 million[4] making it, with the exception of the new FBI Laboratory, perhaps the most expensive crime laboratory in the nation. Despite healthy skepticism expressed by numerous legislators regarding the size and cost of the project, an additional $12 million was appropriated for design and site preparation in FY2009.[5]

The current administration inherited blueprints and a wetlands site prepared for a $106 million crime laboratory. In order to bring down costs, the administration is proposing to leave 19% of the already-designed facility unfinished.[6]

See Appendix A for a table format of the History Of The Crime Lab's Size.

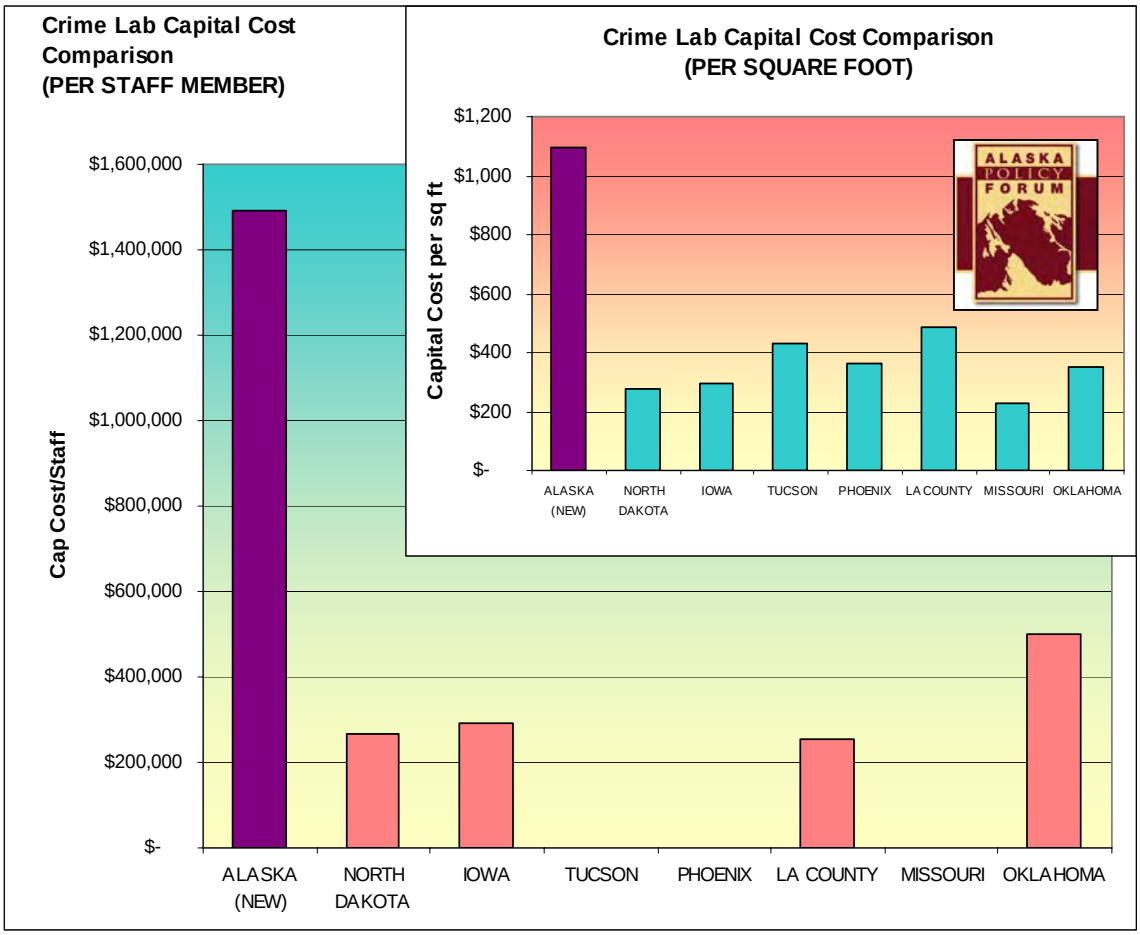


Fig. 1. Crime Lab Capital Cost Comparisons. A. Cost/staff-member & cost/square-foot.

Comparisons with other crime labs

Cost comparisons

Alaska's proposed crime laboratory is far more expensive than other recently constructed facilities (Fig. 1). This holds true from several perspectives, including cost/square-foot, cost/ population served, cost/staff, cost/person served, and cost/annual caseload.

Alaska's proposed crime lab would cost nearly twice as much as Iowa's public health lab, medical examiner lab, agriculture lab, and crime lab *combined*.[7] Iowa's crime lab supports a population four times larger than Alaska's and receives far more evidence to process. In a laboratory significantly smaller than what the Department of Public Safety has proposed for Alaska, the Iowa State Crime Laboratory is currently processing about four times the workload[8]. Alaska's proposed crime laboratory would cost nearly as much as the recently opened Los Angeles County Regional Laboratory. This new five-story facility houses both the L.A. Police

Department Crime Lab and the L.A. County Sheriff's Department Crime Lab, along with classrooms for the California Forensic Science Institute and California State University. Designed for a staff of 400, it is estimated that evidence from 140,000 criminal cases will be

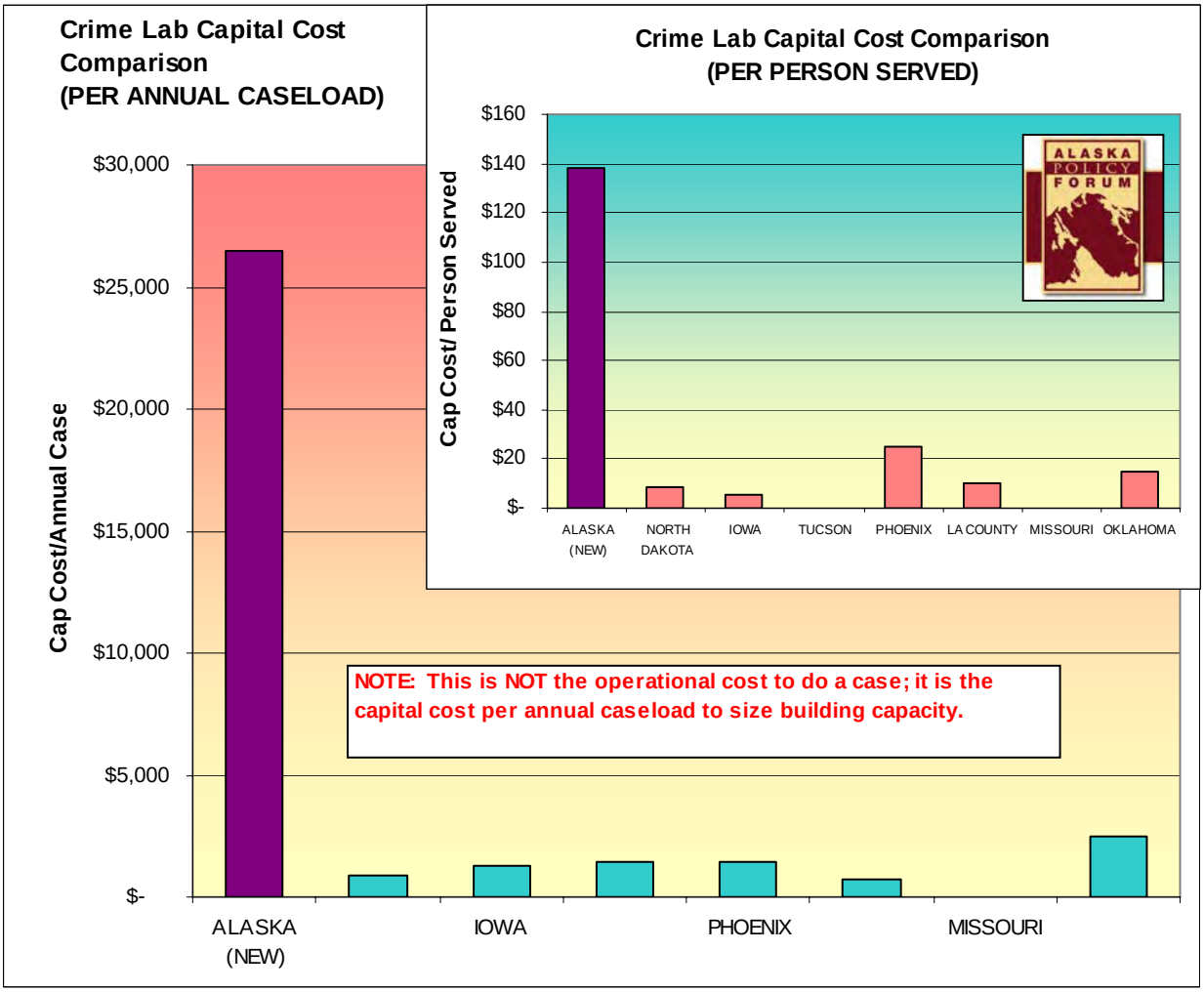


Fig. 2. Crime Lab Capital Cost Comparisons. B. Cost/caseload & cost/person served.

submitted to the laboratory each year.[9] In FY 2008, Alaska's laboratory received evidence from only 3,350 criminal cases.[10]

Alaska's proposed partially finished crime laboratory's price tag is only about $6 million less than the *combined* costs of the recently opened laboratories of the Missouri Highway Patrol, the Arizona Department of Public Safety, the Phoenix Police Department, the Oklahoma Bureau of Investigation, and the State of North Dakota. Serving a population similar to Alaska's, North Dakota's new lab is one-fourth the size, and costs seventeen times less than what the Alaska Department of Public Safety is proposing.[11]

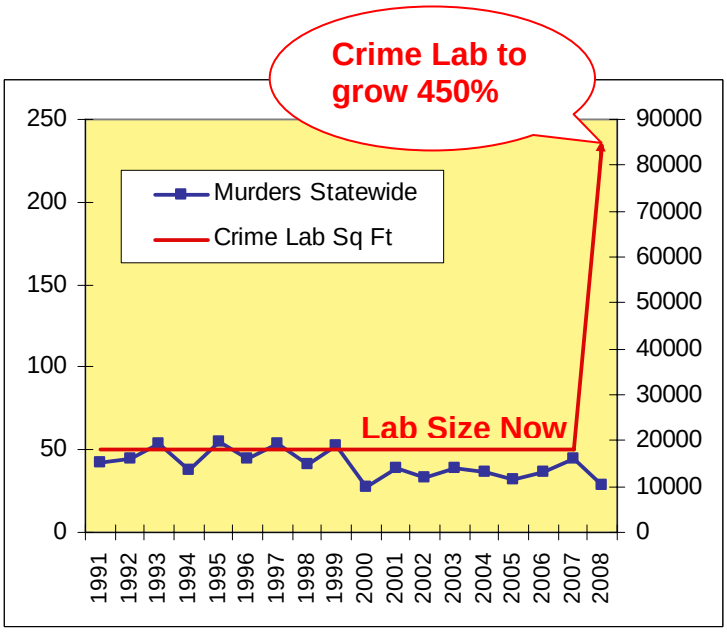
Staffing and Caseload comparisons

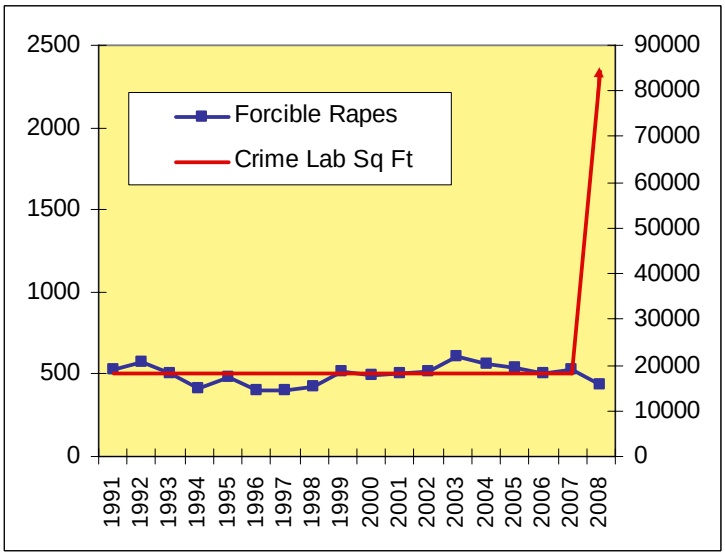
> In a laboratory significantly smaller than what the Department of Public Safety has proposed for Alaska, the Iowa State Crime Laboratory is currently processing about four times the workload.

The needs assessment document for Alaska's proposed crime lab projects a total staff of 60 in 2020 and 65 in 2030. Iowa's laboratory with a staff of 58, annually receives about 4 times the number of criminal cases while servicing a population of about 3,000,000. The new Oklahoma crime lab has a staff of 60 and also receives about 4 times the number of criminal cases. It is highly unlikely that Alaska's population and crime lab caseload will more than quadruple in the next ten years.

Murders, forcible rapes and property crimes in Alaska have either declined or remained stable for the past 19 years despite an increase in population. The rate of crime is declining. Yet, the Department of Public Safety proposes to more than quadruple the size of the crime lab. The consultants apparently did not take these trends into consideration when designing the new facility (See Figure 3).

With Alaska's small population, it should be expected that its crime laboratory would receive evidence from fewer criminal cases than many of the nation's city and county crime laboratories. For example, the Sedgwick County Regional Forensic Science Center in Wichita, Kansas receives evidence from about twice the number of criminal cases than is submitted to the Alaska Crime Lab.[12] Evidence submitted to the Kansas laboratory can be just as complicated as evidence submitted in Alaska. For example, Wichita, Kansas had 26 homicides in 2009. In 2008, Alaska reported 28 homicides. The Sedgwick County crime laboratory has a staff of 19 or about half the number working in Alaska's current crime laboratory (Table 1).





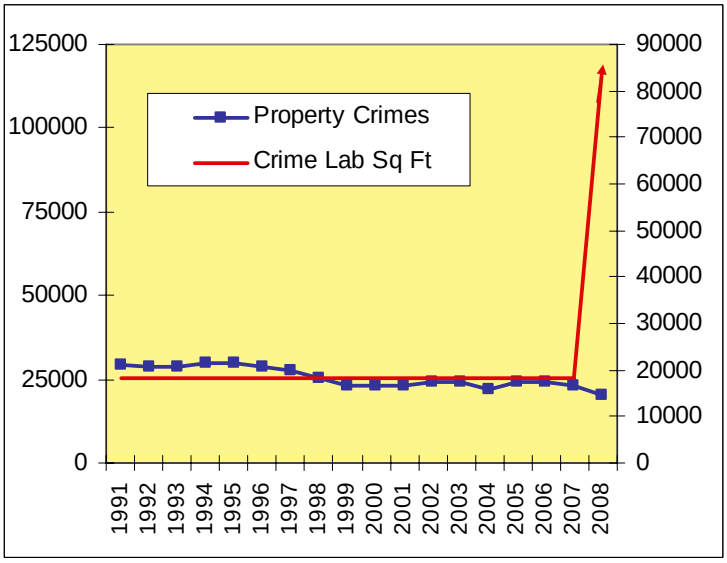
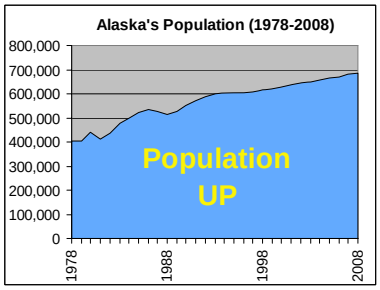
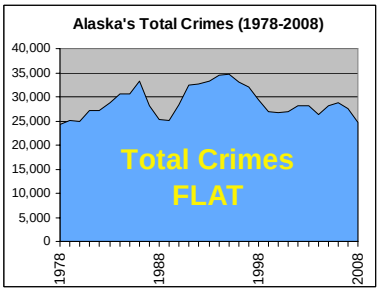
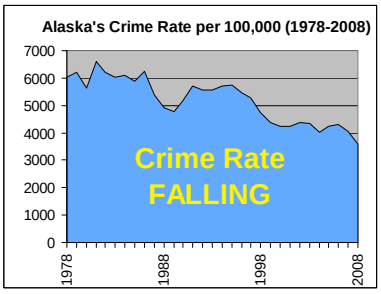


Figure 3

Alaska has Stable to Declining Crime Events







	Sedgwick County, Kansas Crime Lab (2007)	State of Alaska Crime Lab (2008)
Number of Employees	19	39
Cases Received	7325	3350
Drug Cases	4672	1229
NIBIN Cases	182	176
Trace Evidence Cases	45	18
DNA Cases	359	287
CODIS Hits (Y08)	78	12
Toxicology	1275 (full service)	532 (blood alcohol only)
Firearms Cases	546	116

Table 1. Comparison between Sedgwick County Regional Forensic Science Center and the State of Alaska Crime Lab

Alaska's Caseload is Declining

As one of its justifications for building the proposed crime laboratory, the Department of Public Safety has stated that, "All sections of the laboratory are experiencing an increase in the amount of evidence and types of examinations requested for forensic exams." [13]A closer look at the Crime Laboratory's statistics paints a far different picture.[14] The actual number of criminal cases submitted to the laboratory is roughly the same as it was fifteen years ago. Meanwhile, the number of DNA cases submitted to the Alaska crime laboratory has declined each of the past three fiscal years. The total for FY2009 was less than half of what was submitted in FY2006. During the 2000-2002 biennium, Alaska's DNA section received evidence from 951 criminal cases. During the 2007-2009 biennium, Alaska's DNA section received evidence from 532 criminal cases. FY2009 fingerprint evidence requests to the Alaska crime laboratory are down 25% when compared to FY2006 (Fig. 4). In fact, fewer fingerprint cases were submitted to the Alaska crime laboratory in 2009 than were submitted in 1998.

DNA cases have declined each of the past three fiscal years even though the lab received more money.

While staffing has increased, the actual number of criminal cases submitted to the laboratory is about the same as it was fifteen years ago.

It should be noted that if evidence is never collected, the size and cost of a crime laboratory is irrelevant. The steady decline in the number of submitted requests might indicate that additional funding for law enforcement training and equipment is necessary to ensure that physical evidence is properly recognized and collected. If officers do not have enough time to collect evidence, additional officers and evidence technicians should be hired. Additionally, more

sexual assault nurse examiners are likely necessary to obtain relevant evidence from all of the state's sexual assault victims, especially in rural Alaska.

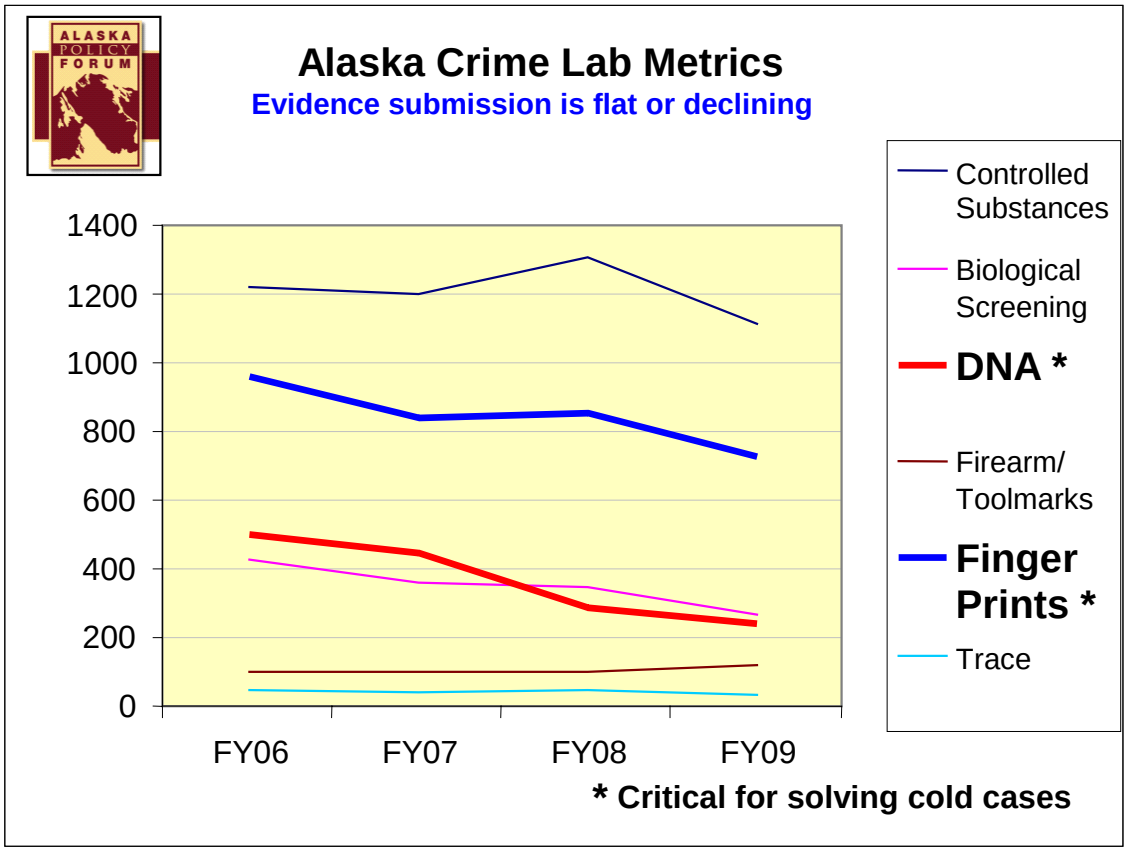


Fig. 4. The last four fiscal years' case submissions fail to justify a lab that is 400% larger.

How the proposal was inflated

Initial Expansion Proposal - In 2005 the Alaska Department of Public Safety (DPS) sought federal funds to expand the existing 18,000 square foot crime lab built in 1986 by 6,000 square feet to meet future demands.

Recommended Lab Size Doubles - Later in 2005, Department of Transportation & Public Facilities (DOTPF) was tasked to hire consultants (USKH/Walls) who recommended doubling the size of the current lab to 38,000 square feet to meet needs until 2020. Two years later a second review was undertaken by DOTPF with new consultants (McClaren, Wilson & Lawrie/Livingston Sloan) who recommended a far larger size facility. Earl Walls Associates and McClaren, Wilson & Lawrie are both experienced and well known designers of forensic laboratories. The conflict in the recommendations of these two specialty consultants has never been satisfactorily resolved.

Recommended Lab Size Quintuples - When McClaren, Wilson & Lawrie/Livingston Sloan initially recommended sizing of the crime lab to 97,000 sf with a cost of $120 million, the Department of Public Safety should have immediately recognized something was seriously amiss. A thorough review of basic assumptions should have been undertaken at that time. Only four years previously,[15] the massive new National FBI Headquarters Laboratory in Quantico Virginia cost a mere $10 million more than this proposal to quintuple the size of the Alaska lab (Fig. 3). [16]

Fig. 3. FBI national headquarters. This "state of the art" crime lab in Quantico, VA opened April 2003 at a cost of $130 million to initially house 650 employees in this 436,000 sf building. *[photo fbi.gov]*

The proposed Alaska crime lab was later cut back from 97,000 sf to the current 84,410 sf (with 16,142 sf of unfinished shell space, Fig. 4). Its cost of $120 million was reduced to $106 million. According to statements made in legislative hearings[17], these cuts were made because "the money wasn't available." A funding request for at least $21 million can be expected for the remaining lab equipment and finishing out this shell space.

> Another funding request for $21 million or more can be expected soon to finish out the shell space. This will bring the total capital cost of this crime lab to $120 million.

Flaws in the 2007 Needs Assessment Document

The 2007 needs assessment document used to justify the size of the lab contains serious flaws. It fails to consider Alaska's limited population, crime rate trends for our state, and the relatively small number of criminal cases annually submitted to the laboratory. Instead of focusing on these statistics, it relies largely on hyperbole. The needs assessment document also failed to consider options that could have limited the size and cost of the new facility. These include utilization of functional space in the existing laboratory, outsourcing, and partnering with other State laboratories. It fails to include a detailed cost/benefit analysis before recommending building expensive laboratory space to analyze rarely encountered evidence types. It also fails to consider emerging forensic technologies that will render large areas of the laboratory

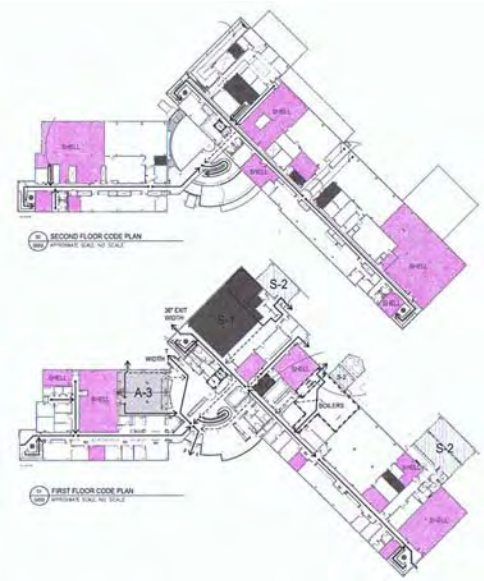


Fig. 4 - DOTPF states that the new crime lab will have 19% unfinished shell space (here indicated in violet). It is actually about 25% of the net usable space.

unnecessary in just a few years. Sections of the laboratory are designed to accommodate far more analysts than needed.

Controlled Substances (Drug Analysis)

The controlled substances section is designed for twice the staffing needed, even when accounting for future growth. The needs assessment document calls for a staff of seven in the controlled substances section of the laboratory. The current laboratory has only two full time equivalent positions working in this section, and projects a need for three full time equivalent positions ten years post move in. However, the section currently does not have a backlog, and the number of drug cases submitted to the laboratory is significantly less today than it was fifteen years ago. The existing crime laboratory already has sufficient capacity to analyze far more drug samples than is currently being submitted. For the number of drug cases to ever outgrow the crime laboratory's capacity to analyze them, the State would have to prosecute many more of its citizens for drug offenses. This would require many more prosecutors, public defenders, judges, and jail space.

From the controlled substances portion of the Needs Assessment Document prepared by McClaren, Wilson & Lawrie, Inc.:

> *Requests for services will increase with the rise in illegal drug use and the continued focus of law enforcement on controlled substances ('War on Drugs'). This disturbing trend will be more problematic in the next decade as the introduction of new and progressively more dangerous, illegal drugs continues and juvenile drug usage increases (page 1.20).*

Toxicology

The size of the toxicology laboratory in the proposed design is the same size as the controlled substances section even though controlled substances typically requires far more space. The needs assessment document calls for a staff of only two for toxicology, less than a third of the projected staff of the controlled substances section. There are far fewer toxicology requests submitted to the laboratory than items of drug evidence, and toxicology samples are smaller, typically consisting of tubes of blood. Drug evidence can be very bulky and require far more space.

Yet the justification for the toxicology is almost the same as the controlled substances portion. From the toxicology portion of the Needs Assessment Document:

> *Requests for services will increase with the continued explosion of illegal drug use and the continued focus of law enforcement on controlled substances ('War on Drugs'). This disturbing trend will likely be more problematic in the next decade as the introduction of new and progressively more dangerous, illegal drugs continues and juvenile drug usage increases. Additionally, the marketplace for illegal drugs continues to pervade the urban and suburban areas (page 1.24).*

The initial expansion study by Earl Walls Associates correctly called for a toxicology section less than half the size of the controlled substances section (page B-3). These quotes are just two examples of the largely generic boilerplate text about forensic lab operation in the 2007 needs assessment. These two design flaws are costly mistakes.

Trace Evidence

The new laboratory has a large amount of space dedicated to trace evidence analysis (i.e. hair, glass, paint, fibers), a service that was offered in the current crime laboratory for approximately fourteen years starting around 1987.

The 2007 McClaren, Wilson & Lawrie needs claims:

> *While trace evidence analysis was performed in the past in the Alaska Statewide Services Crime Laboratory (sic), space shortages have resulted in this lab section being scaled back immensely. It now needs to be resurrected as a new lab section (p. 1.15).*

This simply is not true. Because the demand for such testing was so low, crime lab management decided in 2001 to conduct only preliminary trace evidence testing in-house and when necessary send the evidence to the FBI Laboratory or a private laboratory specializing in trace evidence analysis. Very few trace evidence cases ever had to be shipped out of state. Many crime laboratories around the nation have scaled back or eliminated their trace evidence sections, primarily because DNA has rendered trace evidence examination unnecessary in most investigations. This is especially true of laboratories serving small population bases where highly specialized laboratory requests are seen infrequently. It takes a great deal of training to gain expertise to analyze any of the individual types of trace evidence. The examination and comparison of evidence such as glass, paint, fibers, and explosive residues are highly specialized, and it is impossible to maintain expertise if only a few cases are being submitted to the laboratory. At one time, the laboratory had advanced instrumentation for analyzing trace evidence, including a scanning electron microscope, a microspectrophotometer, and a pyrolysis GC/MS. The first two instruments were sent to State Surplus when they became too expensive to maintain, and the third was transferred to the University of Alaska because it was no longer being used. Federal grant money was available to replace all three instruments, but the limited number of cases requiring trace evidence did not warrant doing so.

It would be very difficult and expensive for this service to be reestablished, as the laboratory no longer has an experienced, court-qualified trace evidence examiner to do the work or provide training. Training requirements to gain expertise for all the various trace evidence types (i.e. glass, fibers, paint, explosive residue testing etc.) are very extensive.

> New crime lab sizing was based on outdated or flawed "standards."

One of the other factors that contributed to the inflated size of the proposal was that one of the documents consulted was out of date. Testimony was given at the April 9th Meeting of the House Finance Committee regarding the need for crime labs to have 1000 square feet per person.[18] This recommendation is from the 1998 document, *Forensic Laboratories: Handbook for Facility Planning, Design, Construction, and Moving* which includes a reference to a 1991 publication (Springer-Verlag). This recommendation refers to gross square feet, not net square feet, and therefore, accounts for a prorated portion of corridors, mechanical rooms, toilets, lobbies, etc., for each technical and support staff member. The Department of Public Safety's consultant also referred to this publication in their Space Needs Assessment document dated 24 September 2007, where they described the document as containing "Design Standards."[19] However, the document itself on the first page says it is NOT a "standard":

> *The document, Forensic Laboratories: Handbook for Facility Planning, Design, Construction, and Moving, is the product of a 2-day seminar where 23 professionals met, divided into four groups, and created this handbook. The handbook is* ***not a standard*** *(emphasis added) but a resource for those faced with building a new facility or the redesign of an existing facility.* [20]

It should be noted that this seminar took place in 1996, and references a 1991 publication written at a time when large instruments occupied entire rooms and DNA "fingerprinting" was very labor intensive and required the use of radioactive chemicals. For many modern crime labs the ratio is considerably less than 1000 square feet per person. For example, the L.A. County Regional Laboratory is designed for a staff of 400 and is 209,000 square feet (523 sf/staffer). With the first floor of this five-story forensic center dedicated to classrooms for California's Forensic Science Institute and the California State University's School of Criminal Justice and Criminalistics, their ratio is even lower.

> Miniaturization of laboratory testing equipment is revolutionizing forensics. Instruments that occupied entire rooms are now tabletop size. The new crime lab sizing is based on outdated assumptions.

The new FBI National Laboratory in Quantico, VA also makes the case that 1000 square feet per person is not needed. It had nearly 650 laboratory employees when moving into a new 463,000 square foot (671 sf/staffer). Yet, the Department of Public Safety is proposing to build a new 84,400 square foot crime laboratory to house a projected staff of 62 (1,361 sf/staffer).

Dept. of Public Safety has also stated that one of the reasons the proposed laboratory is so large is that it is being designed to meet future needs. However, when designing new forensic facilities it is important to take into consideration advances in technology. Like computers, laboratory instruments are becoming smaller, more powerful, and less expensive. Miniaturization of laboratory testing equipment is revolutionizing forensic science and crime scene investigation.[21] As such, instruments that occupied entire rooms when the current laboratory opened in 1986 have been replaced with much smaller high-performance tabletop instruments that cost a fraction of their predecessors.

Advances in DNA technology have been especially rapid. New genetic analyzers can analyze DNA multiple samples sixteen times faster than instruments they replaced, all while occupying a similar space. In England, DNA testing equipment has already been miniaturized and automated to a point that it fits in a van. From a 2005 Forensic Science Service Press Release:

> *DNA analysis of samples from the crime scene – samples will be fed into the van, analyzed, and checked against The National DNA Database® and police will have a match report back in approximately eight hours. As well as being at least three times faster than the current DNA turnaround time, this cuts out administration effort as items of evidence have until now been passed along a supply chain which eventually sees them arrive at a laboratory. The advance has been made possible through technological developments allowing the condensing of an entire DNA-processing line (whole building size) into a mobile environment.* [22]

Even smaller testing equipment is being developed and will soon be available. The United States Government has made the development of a rapid DNA profiling system a national priority. The goal is to create an integrated "DNA Laboratory in a box" that can analyze DNA samples in a matter of minutes without the need for expensive laboratory space or highly trained technicians. The National Institute of Justice has been funding grants to develop a compact, high-throughput genetic identification system that quickly analyzes DNA evidence from crime scenes and known felons at very low cost.[23] Lab-on-a-chip technology literally reproduces the functionality of a complete laboratory system down to the size of a microchip no more than several square centimeters in size. Prototypes have already been developed[24 25 26 27] and one has been tested at a mock crime scene.[28] With DNA analysis becoming increasingly compact and automated, ignoring this trend would lead to a costly mistake of greatly overbuilding laboratory space to meet future demands that won't likely occur.

> CRITICAL ISSUE: DNA analysis is becoming increasingly compact and automated. Ignoring this trend will lead to the costly mistake of overbuilding to meet future demands that won't likely occur.

> Planning an expansion to last 40 years when the trends will change all the rules in 5-10 years appears reckless.

In 2000, the US National Commission on the Future of DNA Evidence predicted that within ten years, hand-held machinery such as "lab-on-a-chip" would permit technicians to carry out DNA testing directly at crime scenes. In 2005, this position

Continued on Page 20

WHY WAS IT NECESSARY TO BUILD THE NEW CRIME LAB ON A COSTLY WETLANDS SITE?

Options to open up ample space for the lab's needed expansion including through more efficient densification of use of the state's 5800 East Tudor Road facility complex where the crime lab is currently sited were not adequately considered.

The existing crime lab is part of DOTPF's Anchorage District Highway Complex. The Dept. of Public Safety/State Troopers headquarters is also on the site. The entire 37-acres is a gravel pad on good, buildable soils yet most of the tract is devoted to vehicle and equipment yards (see CRIME LAB SITE ALTERNATES, below).

(Two siting studies were completed in 2005 and 2008)

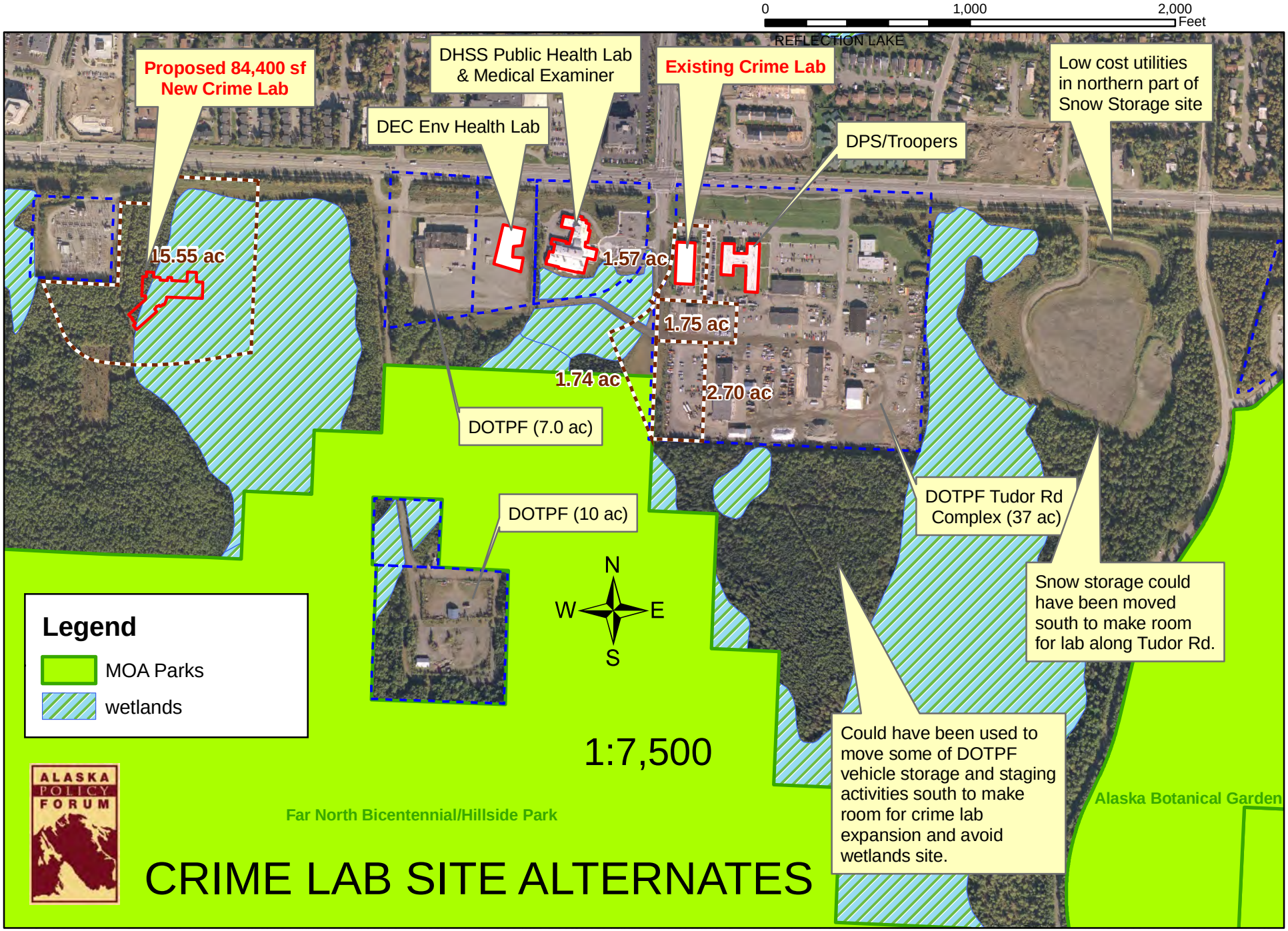
About the time that studies were done, DOTPF was finalizing the takeover of the 26,000 sf building and 17 acres released by the Army National Guard when it moved to new quarters on Ft. Richardson. These new DOTPF resources should have allowed for release of portions of the old complex for extensions to the existing lab, building conversions, etc.

USKH / Earl Walls Associates Study – 12/1/05 - Identified "SITE 0" (see map) just south of the DOTPF Tudor Road Campus. This site has good soils and minor to no wetlands limitations. However, the siting discussion was flawed in that it did not consider a separate addition building nearby, perhaps connected with a corridor, to reduce the need to build all new space. Furthermore it did not discuss demolishing or converting the DOTPF structure directly behind the lab into vehicle inspection, evidence storage or other appropriate functions that could have been moved there to free up space in the main building and save substantial resources. Note that the building below is larger than the original expansion request for 6,000 sf that started the process culminating in the 97,000 sf recommendation.

Figure 5 – Adjacent to existing lab (in background) is this 7,500 sf – road sign shop and warehouse for signs, paint and other items. A recent inspection showed little activity around it, no tire tracks in the snow and no vehicles parked in the sizable lot surrounding it.

DOWL Siting Study – 1/08 - After DPS accepted increasing the lab size to 84,400 sf, DOTPF redid the site selection, which picked the 15.5-acre wetland site requiring $8 million in site costs. However, it was not considered that 92% of the south 22.6 acres of the DOTPF complex consists of sand, vehicle and equipment storage as well as vacant land. Even the large crime lab could have been built on 5 acres at the southwest corner of the Tudor complex that is now vacant or used for vehicle/equipment storage. Such storage could be moved south to "Site 0" which was condemned because it was too far from utilities. All of this would have avoided expensive wetlands mitigation.

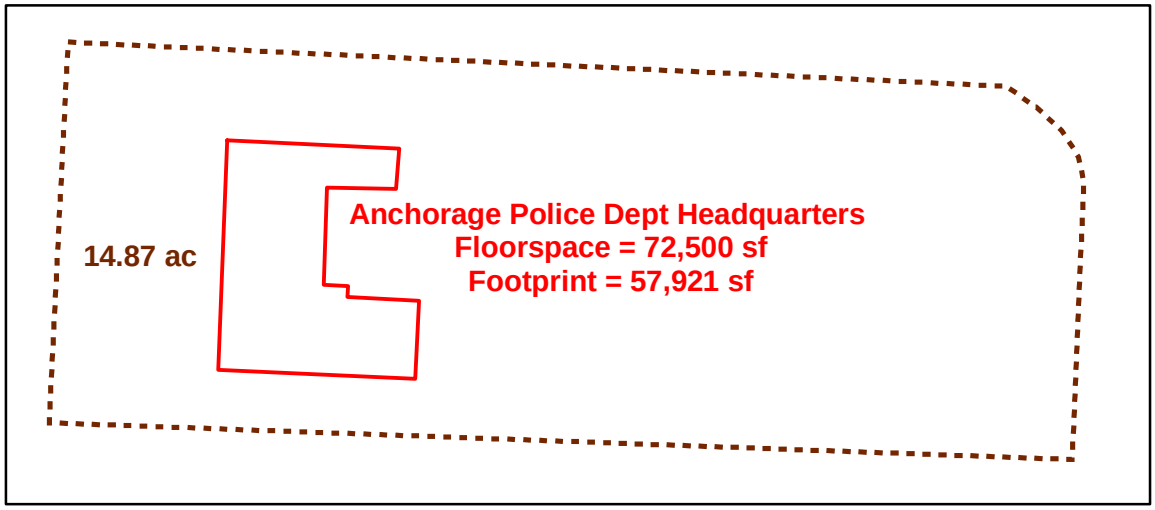
Finally, neither of the DOTPF siting processes addressed using the north portion of the snow storage site close to the utilities along Tudor Road. Displaced snow storage could have been moved further south or relocated elsewhere.



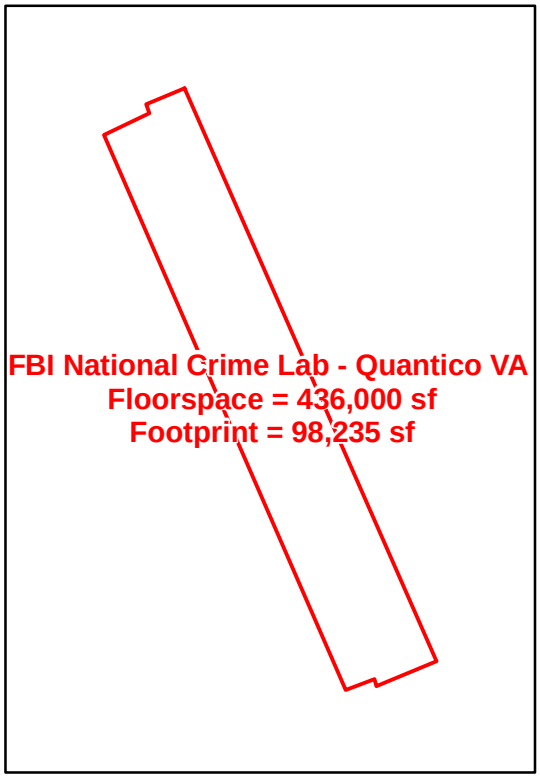
CRIME LAB SITE ALTERNATES

CrimeLabSites[8x11].mxd

1:3,000



1:3,000



HOW BIG IS THE PROPOSED NEW CRIME LAB?

How big is the site?

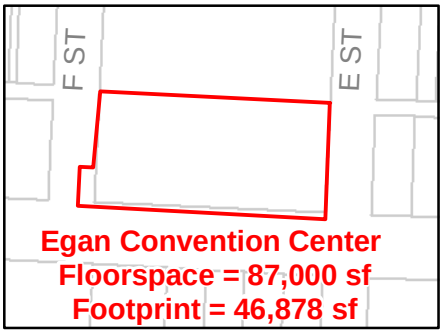
	FLOORSPACE (sf)	FOOTPRINT (sf)	SITE SIZE (acres)
Alaska State Capital (Juneau)	90,000	15,154	0.76
Egan Center	87,000	47,112	1.08
NEW CRIME LAB	**84,400**	**41,969**	**15.55**
Anchorage Police Headquarters	72,500	58,000	14.87
Alaska Dept Public Safety State Headquarters	54,000	27,989	
State Public Health Lab & Medical Examiner	40,000	38,800	
Existing Crime Lab	**18,200**	**18,200**	

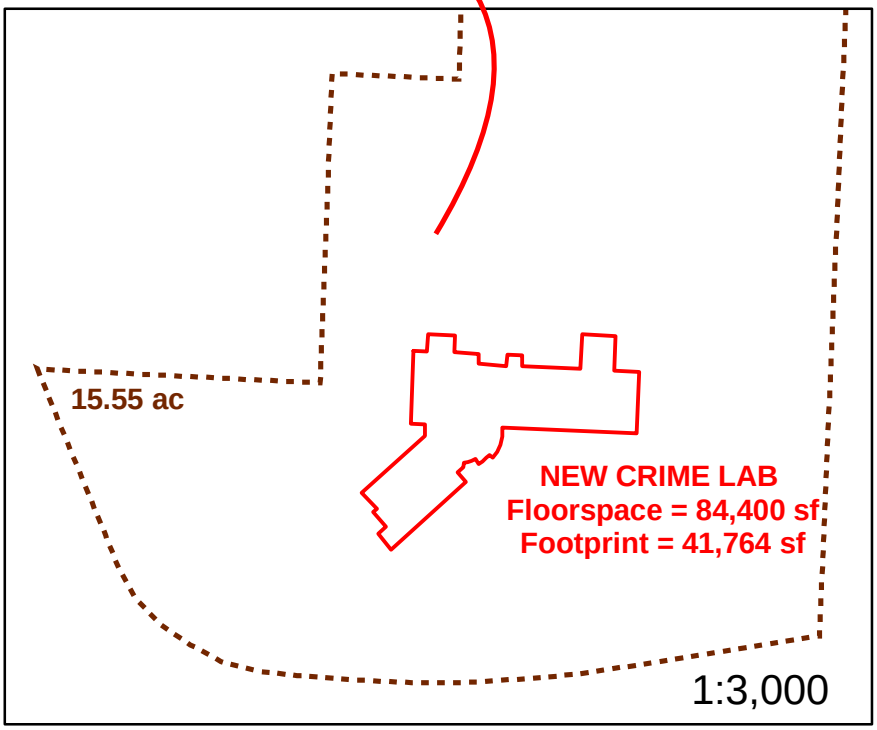
CrimeLab[11x8].mxd

TUDOR ROAD POLICE/TROOPER INSTITUTIONAL CORRIDOR IN ANCHORAGE

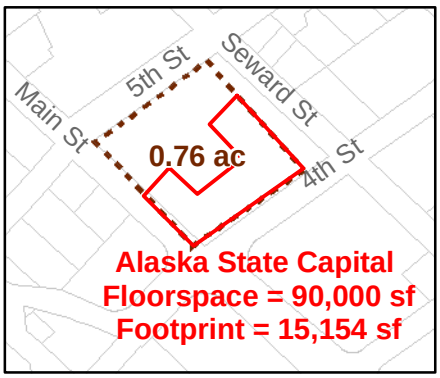
1:10,000

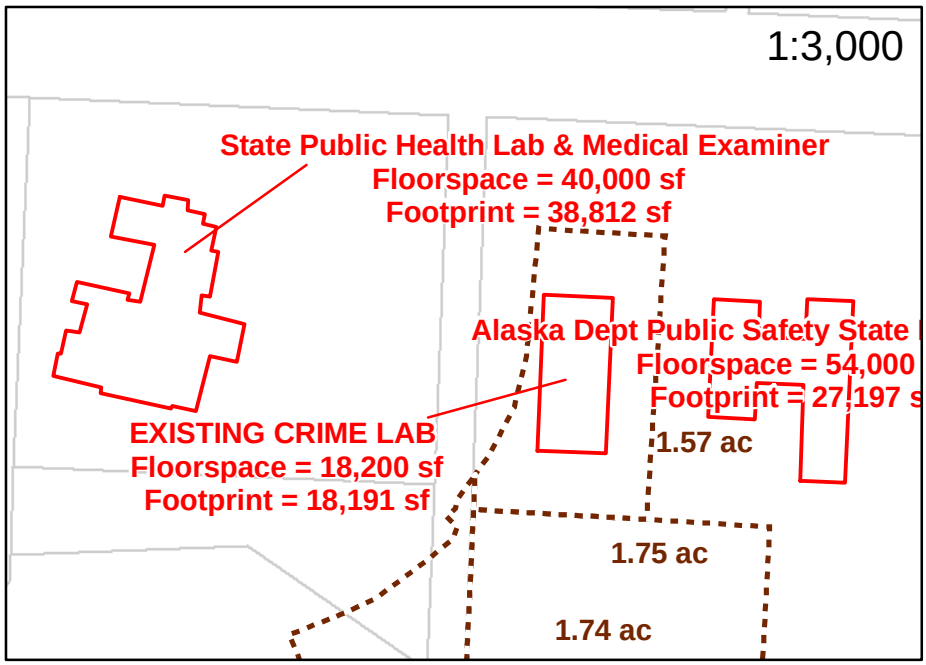
1:3,000





1:3,000





CrimeLab[11x8].mxd

was echoed by a House of Commons report, which further added that such devices directly linked to forensic databases would diminish the demand for laboratory-based services. Taking this into consideration, Alaska must have a comprehensive forensic plan for the entire state, and not one based on the large central laboratory systems that were in vogue during the1980s and '90s.

A recent presentation by FBI expert Leslie D. McCurdy describes a future of DNA databasing without the need for large dedicated laboratory space (Appendix B).[29]

Comments on Building Costs

Operational Cost Impact
The decision to grow the building by four or five times will have an enormous impact on the annual budget funding request to staff and operate the facility. There will be substantial cost increases on operations, maintenance, personnel, and especially utility expense for the Alaska Scientific Crime Detection Laboratory. According to testimony before the legislature, "The staff is currently 41 people with the need for one more custodial position. Over twenty years the staff would increase to 62 employees."[30] The legislature should analyze the full fiscal impact of the operations expense increase stemming from the decision to increase the size of this building. Is a 400% increase in building size really going to increase personnel by only 50%?

Excessive Design Features
The design of the new Alaska crime lab building contains extra features that are not necessary. The new laboratory contains includes three separate conference rooms, sixteen bathrooms and thirteen private offices. One room is designated for a piece of equipment called an Electrostatic Detection Apparatus. About the size of a small microwave oven, this equipment does not require a separate room. Design flaws like these add millions of dollars to the cost of the building.

> What is the rationale for spending all this money on luxuries that are not required to accomplish the mission of Alaska's crime lab?

The new laboratory is lavish and extravagant. The architect proposed to clad the building with over a million dollars of charcoal black granite[31]. Additionally, the building features polished granite stair treads costing $900 each that add another $38,000 to the cost. The building has three fully glassed in stairwells that will have higher energy loss and low usage (see front cover, lower right of building). The oversized 15.5 acre park-like site consumes far too much land and it is landscaped with 275 trees and bushes that cost over 500,000 dollars. The cost to maintain the elaborate landscape plantings is not addressed. The grounds feature three picnic tables and benches costing $13,000 to $36,000 and $52,000 of fencing screens the dumpster. With only 41 employees (growing to 62 over 20 years) and very few public visitors, what is the rationale for spending all this money on luxuries that are not required to accomplish the mission of Alaska's crime lab?

Recommendations That Can Save The State $Millions

The State of Alaska is at serious risk of wasting $50-100 million or more if it goes ahead this session with the proposal to build a partially finished 84,400 square foot new crime lab on the selected 15.5-acre site. The case for this project is not made, it is not fiscally responsible nor the best use of the crime fighting dollars of Alaskans. At a minimum, the project should be put on hold for one to three years until it can be reexamined from the aspects discussed in this report. Of paramount importance are technological trends that can make much of what is proposed obsolete. Planning an expansion to last 40 years when the trends will change all the rules in 5-10 years appears unreasonable.

A properly done needs assessment of the crime lab and expansion study could well find that a modest expansion of the current building at the current site would deliver the best value to Alaskan citizens in overall crime fighting and security.

The $75.75 million appropriation presented to the legislature is not the total size of the obligation that will result from its approval. This building has extensive unfinished "shell" space which in the description states will not be built out until 2020 and 2030 but it is probable that the proponents will return to the legislature asking for $21 million or more to finish it. It is oversized and unnecessary at $93 million and even more so at $123 million. And these are only the capital costs. The operational cost increases that will burden the State for the next 40 years are poorly addressed by the Department of Public Safety. Instead of putting $125 million into a new crime lab it may be more cost-effective to spend $30 million on remodeling the existing crime lab and putting $85 million in to upgrading law enforcement and criminal justice infrastructure. This project needs that kind of global analysis before preceding any further.

The comments below provide information on the current lab facility.

The current laboratory is still functional and contains space that is not obsolete.

The existing lab does need expansion and there is space nearby for that on the DOTPF Tudor complex.

Vehicle Exam Area

The design of the new laboratory has a large garage area for examining vehicles. The current crime laboratory already contains an excellent vehicle examination area. But it is only used to examine vehicles from Anchorage. In addition, the APD Headquarters Expansion (discussed below) plans construction of additional evidence vehicle inspection bays. Money saved by not

> Don't waste money duplicating an excellent vehicle exam room in Anchorage. Use it to upgrade or construct such facilities needed in other areas of the state.

duplicating vehicle examination areas already present in Anchorage could be used to upgrade or construct such facilities in other areas of the State.

Training Laboratory
The new crime laboratory has what is described as a "Training laboratory for 20 persons." Training laboratories are not the norm for working forensic laboratories and are not required for crime laboratory accreditation or analyst certification. If laboratory management feels strongly that a training laboratory is necessary, functional space in the existing laboratory can be used for this purpose.

Evidence Storage
The current laboratory contains a secure evidence storage room. This space could easily be utilized for evidence that needs to be retained long term. The square footage for evidence storage in the new laboratory could thus be reduced.

Classroom
The new laboratory contains a large classroom for sixty persons. The current laboratory already contains a classroom that is suitable for most training sessions held at the lab. Has the use of nearby university rooms and facilities been investigated? APD already has many classrooms at its Jewel Lake facility.

Crime Scene Response
The new laboratory has space dedicated for crime scene investigation. This function could easily be housed in the current laboratory. The current laboratory already has a room that was remodeled a few years ago to store crime scene equipment. It should be noted that personnel from the Anchorage crime laboratory no longer respond to major crime scenes as in the past. This has nothing to do with the size of the current crime lab. Furthermore, the new lab design has a crime scene sally port. The laboratory's crime scene response vehicle was given away because it was not being used.

Breath Alcohol and DNA Database Samples
According to a February, 2010 paper authored by the Department of Public Safety, 78.8% of the laboratory's requests for FY 2009 involve Breath Alcohol and DNA Database samples.[32] Neither of these functions need be located at the new crime laboratory.

All of the 8,067 breath alcohol "requests" in FY09 were actually performed by law enforcement officers located throughout the state. None of these "requests" were performed at the crime laboratory. The crime laboratory manages the State Breath Alcohol Program, trains officers, provides expert testimony, calibrates instruments, and prepares quality assurance standards. No evidence is submitted to the breath alcohol section of the laboratory.

Only a few years ago the crime laboratory's photo lab was demolished and completely remodeled to create a new work area for the State Breath Alcohol Program. This area is still perfectly adequate. The State Breath Alcohol Program does not even need to remain under the Department of Public Safety. In many states around the county, breath alcohol programs are managed by the public health lab. This is the case in California, Vermont, Missouri, Colorado, Wyoming, and Kansas, among others. Alaska's Breath Alcohol Program was at one time managed by the Alaska Department of Health and Social Services.

The current crime lab contains a DNA laboratory that was opened in 2003 after an expensive renovation of the space formerly occupied by the State Medical Examiner. [33] This laboratory has state of the art genetic analyzers that are capable of typing 100,000 DNA database samples a year. The lab currently receives about 8,000 samples a year.

Capability Assessment: Some of the capabilities that the new crime lab would serve need to be reassessed to ensure they are not duplicative or better handled by another facility.

Toxicology capability

At a cost of over $1,000 per square foot, the Department of Public Safety proposes to spend millions of dollars on new laboratory space for toxicology. Fewer than two toxicology samples per day are generated annually by Alaskan law enforcement agencies. The Alaska Public Health Laboratory located next to the Crime Lab already contains an under-utilized space for toxicology and has as one of its missions providing forensic toxicology support to the State Medical Examiners office.[34] Rather than building new laboratory space for toxicology, the State should perform toxicology at the Alaska Public Health Laboratory in a consolidated toxicology program that analyzes samples from law enforcement and the State Medical Examiner's Office. This is the approach that many states around the nation are using. This would cut duplicate staffing, save the cost of building the facility, and could provide the service without waiting for the shell space to be built out in 2020.

> DPS wants to spend millions on shell space for a new toxicology lab not scheduled for use until 2020. The public health lab has a toxicology section DA's could use, a practice common in many other states!

Questioned Documents capability

The new laboratory design has a dedicated space for the examination of questioned documents (i.e. handwriting comparisons, altered documents, etc.). At one time, the Anchorage Police Department employed a court qualified document examiner who was also a Police Officer. Before he left Alaska to work for the Oregon State Police Crime Lab, document evidence submitted to the crime laboratory was forwarded to APD for him to examine. Even though this service was offered, very few cases were ever

requested. Even if the Laboratory wanted to offer document examinations, it is doubtful that the crime laboratory could recruit a qualified examiner to Alaska, as there are so few in the United States. It is also not practical to train a member of the existing staff as an extensive apprenticeship program lasting approximately two years under the direct supervision of a qualified document examiner is required to gain the necessary expertise for this field.[35]

Outsourcing: The state crime lab needs to seriously undertake a cost/benefit analysis for determining when to outsource a capability.

Trace Evidence Analysis
The new laboratory has a large amount of space dedicated to trace evidence analysis (i.e. hair, glass, paint, fibers), a service that was offered in the current crime laboratory for approximately fourteen years starting around 1987. Because the demand for such testing was so low, crime lab management decided to conduct only preliminary trace evidence testing in-house and when necessary send the evidence to an "outside" laboratory. Very few trace evidence cases ever had to be shipped out of state.

> Alaska is better off sending rare cases to an expert that processes hundreds of them.

There is a very high cost of maintaining proficiency, equipment and operator training when relatively few samples are tested. The per-sample cost is very high. Furthermore, maintaining building clean air negative pressure in a cold climate involves higher building energy use and expense than a similar facility in a more moderate climate. These factors mandate the careful consideration of outsourcing to be fiscally responsible.

Many crime laboratories around the nation have scaled back or eliminated their trace evidence sections, primarily because DNA has rendered trace evidence examination unnecessary in most investigations. This is especially true of laboratories serving small population bases where highly specialized laboratory requests are seen infrequently. Evidence requiring such testing can be sent to the FBI Laboratory or to a private laboratory specializing in trace evidence analysis.

DNA Database Samples
In FY 2009 the laboratory received 7,401 DNA database samples (less than 30 per workday). These samples could have been outsourced to an FBI approved private laboratory. Many states around the country have found that it is more cost-effective to utilize such private laboratories under the National Institute of Justice's outsourcing contract program. Since 2003, over 35 states have contacted NIJ for federal assistance through this program.[36]

Most of the first ten thousand DNA database samples added to Alaska's database were analyzed by private laboratories and paid for using federal grant money. If the State

decided to directly contract with a private laboratory, the current rate is $35.00 per sample, or about $260,000 for 7,400 samples. This is a fraction of what the State is currently paying to type these samples at the crime laboratory. These samples are for preliminary identification and are not used in legal proceedings and therefore no expenses for expert testimony would be incurred. With future technology currently being developed, the costs can be expected to decrease, and many tests will be performed in booking stations (jails) thus not requiring expansive dedicated laboratory space.

What synergies are possible with the Anchorage Police Department Headquarters Expansion?

Support documents for the proposed new crime lab are silent about another major related nearby project on Tudor Road.

The Municipality of Anchorage is planning a $40 million expansion to its police headquarters located one mile west from the existing crime lab and ½ mile west of the site for the proposed new lab[37]. A budget request for a state grant for all or part of the cost is expected next year. This includes construction of a 45,000 square foot building to contain a consolidated Property & Evidence Unit, Vehicle Impound Section, Latent Print Crime Laboratory, Evidence Vehicle Inspection Bays and an Indoor Secure Evidence Vehicle Storage Area as well as an Outdoor Secure Vehicle Storage lot (capacity 300 vehicles) and an adjacent free span building (20,000 square foot) to provide warm secure storage of mission essential emergency response vehicles.

There would be no need for the vehicle examination area in the proposed crime lab if the APD expansion is built as contemplated.

Conclusion

For those considering whether it is too late to turn back, consider how the saved resources could be reallocated and more directly affect crime resolution, including domestic abuse and sexual crime. The state should consider hiring additional law enforcement officers and upgrading police facilities around the state. The state also needs to invest in training and equipping law enforcement officers to properly collect and send evidence to the crime lab. These “boots on the ground” would be a better use of resources. The size and staffing of any crime laboratory is irrelevant if evidence is never collected and submitted for testing.

DPS is requesting $75 million more to complete the current crime lab proposal. It’s a certainty that another $25 million request is in the future to complete the shell space and fill it with the lab equipment stated as necessary. If the current project were abandoned then it is possible the $8 million spent on improvement of the wetland-covered site could be reimbursed by the Municipality of Anchorage for a total of $108 million of funds potentially saved. If $25 million were used to improve the existing lab then the question

should be, is there a better use for $82 million saved? At a 30-year municipal bond interest rate of 5%, this equates to a principal and interest savings of $5 million per year. If it were used in public safety/crime prevention it could pay for 50 additional personnel (police, crime scene processing technicians etc.) Experts have said the best way to fight crime is to have more presence on the streets and more working of cases with no suspects.

> Investigate better serving Alaskans statewide by moving away from legacy centralized lab models with everything concentrated in Anchorage.

It may be that the State needs to consider developing a new crime lab model. To better fit Alaska, the state might consider creating small satellite labs in key locations staffed with technicians that could rapidly respond to local crime scenes, process for fingerprints, and collect and screen other evidence. From a forensic and law enforcement perspective, time is of the essence when investigating crime. Due to Alaska's immense size, it is not practical to send lab personnel from Anchorage to remote areas of the state for crimes such as burglaries and stolen vehicles. Even with serious crimes, delays in investigation can potentially compromise evidence. Locally based technicians responding quickly to crime scenes will enable greater recovery and faster processing of evidence. This is particularly true of fingerprints, which can often be obliterated in transport across Alaska. Furthermore, it is now more feasible to decentralize because of the instrumentation miniaturization previously discussed.

> Local DNA analysis from miniaturized equipment is potentially far more effective than analysis at large remote laboratories.

The State also needs to adopt a policy that assumes that technology in the future will most likely be smaller, not larger, and require less time and training, not more. In the future, technicians equipped with lab-on-a-chip technology may even be able provide the same type of remote, onsite services that has already been achieved in England through the use of mobile labs. The following quote from a 2005 Forensic Science Service press release summarizes the advantages of such a system which:

> *…offers a fundamentally different way of delivering DNA and other forensic services which in turn will help us to continue to significantly reduce crime by catching offenders quickly…Local DNA analysis from miniaturised equipment is potentially far more effective than analysis at large remote laboratories...*[38]

Alaska must have a comprehensive forensic science plan for the entire state, and not one based on the large central laboratory systems that were in vogue during the 1980s and 1990s. The crime lab should be right-sized, designed for purpose, and use appropriate criteria for outsourcing vs. performing in-house and partnering with sister labs and government departments and facilities to optimize costs and timely results.

APPENDIX A - HISTORY OF THE CRIME LAB'S EXPLODING SIZE			
DATE	SIZE (sf)	COST	COMMENT
Prior to 1978			Fingerprint labs in Juneau and Anchorage in State Troopers headquarters buildings. Drug testing and toxicology was performed in a private lab in Anchorage.
1978			Alaska lab started in the basement of State Trooper building on Tudor. Chris Beheim the first forensic chemist hired.
1986	**18,000 sf**	$5.2 million	**Existing Alaska Scientific Crime Detection Laboratory** opens under director George Taft
2003		$0.4 million	Autopsy area in the back of the lab demolished and state of the art DNA laboratory constructed.
2005	*6,000 sf addition requested*		In 2005, the Department of Public Safety sought federal funds to expand the crime lab by 6,000 square feet to meet future demands.[39]
12/01/05	**6,000 sf** ↓ **38,000 sf**		USKH / Earl Walls Associates Study - The 2005 study recommended 38,000 sf lab and is well written and has good documentation and attention to detail. However, the siting discussion was flawed in that it did not consider a separate addition building nearby, perhaps connected with a corridor to reduce the need to build all new space. Furthermore it did not discuss demolishing or converting the sizable DOTPF structure right behind the lab (to the south) into vehicle inspection, evidence storage or other appropriate functions. These could have been moved back there to free up space in the main building and save substantial money.
2006			The Department of Public Safety received $4.8 million dollars for design of a new 38,000 square foot facility[40] and the contract was awarded to Livingston Sloan.
2007	**38,000 sf** ↓ **97,000 sf**		Soon after Livingston Sloan was allowed to subcontract with McClaren, Wilson & Lawrie to do another sizing study. This eventually more than doubled again the size of the proposed laboratory and the cost of the project soared to over $100 million[41] making it, one of the most expensive crime laboratories in the nation.
2007	97,000 sf	$120 million	Contradictory testimony before the 2/7/08 House Finance Committee described how a 97,000 sf sizing and $120 million cost was arrived at "based on need" before the finalizing of the McClaren Wilson & Lawrie, Inc. 2007 Space Needs Assessment. "An executive decision was made near the end of the study phase to limit the scope of the project to $106

APPENDIX A - HISTORY OF THE CRIME LAB'S EXPLODING SIZE			
DATE	SIZE (sf)	COST	COMMENT
			million"
10/15/07	83,370 sf for 2020 91,477 sf for 2030	$106 million	McClaren Wilson & Lawrie, Inc. 2007 Space Needs Assessment - Recommended 91,477 sf for 2030. The 2007 study is largely generic boilerplate text about forensic lab operation and lacks substance. Furthermore it has a number of errors that undermine the credibility of the lab sizing recommendations reported[42].
01/15/08			Gov Palin proposes issuance and sale of $100 million bond for design and construction of crime lab. This proposal did not pass.
01/08	15 acre site		DOWL Siting Study - When DPS accepted jumping the building size to 84,400 sf, DOTPF had to redo the site selection and decided on the proposed 15 acre site which was over half wetlands and required $8 million in gravel fill and mitigation payments. Siting of the facility on the DOTPF Tudor Road Campus and moving vehicle lots to "Site 0" was a viable alternative not discussed that could have avoided expensive wetlands mitigation.
04/08			Despite healthy skepticism expressed by numerous legislators regarding the size and cost of the project, an additional $12 million was appropriated for design and site preparation for FY2009.[43]
04/09			Only activity in the 2009 legislative session was a House Finance committee hearing with testimony for and legislative questioning about the proposed crime lab. No further action was taken.
01/10	84,410 sf including 19% unfinished shell	$92.6 million	Governor Parnell proposes a modified project reducing the cost by $16 million to $93 million with $76 million more requested to complete. To bring down the cost the DPS is now proposing to leave 19% of the facility unfinished at this time.
02/12/10	Intent to finish shell space	**$92.6 million** ↓ **$123 million**	Media interviews and statements by DOTPF indicate that the Legislature should expect to be asked for more money to complete and equip the shelled space. DPS has no intention of waiting until the 2020 and 2030 dates to finish the shell space. A $20-30 million dollar request will be following soon to finish it all for a TOTAL of $123 million cap cost for this lab.

FBI Science and Technology Branch
Rapid DNA Analysis Initiative

Leslie D. McCurdy, PhD
leslie.mccurdy@ic.fbi.gov
2009 Biometric Consortium Conference
Tampa, FL

US Government Prototype Initiatives

Rapid DNA Profiling System
Automated Nuclear DNA Equipment (ANDE)

(a joint DoD/FBI/DHS initiative)

- Analysis and matching of multiple DNA samples in **1 hour (18 month development program)**

DHS Low-Cost and Rapid DNA-based Biometric Device

- Demonstrate an automated desktop prototype device that verifies identity or kinship **within an hour**
  (2 year development program)

Exploit Reference DNA Profiles During Arrestee/Detainee Processing 4-7 Year Vision

- 3-4 Years Prototypes in State Labs for SDIS evaluation
  - Concordance testing and validation
- 5-7 Years at Local Booking Stations
  - Collect DNA at the Booking Station
  - Integrated DNA "Laboratory in a Box"
  - Collection and analysis in minutes
  - Automated profile preparation and submission
  - Search in real-time against forensic profiles
  - Modify CODIS for real-time NDIS searching (QAS Compliance)
  - Refer to DNA examiner for candidate match resolution
  - Return "Red Light/Green Light" result to booking station
- Apprise Investigating & Charging Authorities of Candidate Hits
- Prioritize for confirmatory analysis in Laboratory

13

Statement of Motivation and Goals

Gap: **Human DNA analysis requires large lab infrastructure, dedicated technicians.**

Slow, costly process limits range of practical applications

Goal: **Automated Rapid DNA Profiling Systems**

Minimize processing time, maximize utility of information

Automate and simplify interfaces for non-technical users

Approach: Integration of automated nuclear DNA analysis system

Set core requirements based on 18-month rapid development effort

Automated reference sample analysis in 1 hour

Build strong foundation to support customization and expanded capabilities

Forensic data via quantitation, sequencing, bioagent ID, automated forensic analysis, etc.

Custom systems to meet needs of numerous government organizations with growing needs for human DNA analysis

14

Dr. Leslie D. McCurdy
Acting Unit Chief, Supervisory Biologist, Laboratory Division
Federal Bureau of Investigation

2501 Investigation Parkway
Quantico, VA 22135
(703) 632-7601 leslie.mccurdy@ic.fbi.gov

Topic: FBI Science and Technology Branch Rapid DNA Analysis Initiative

Abstract: DNA analysis has been referred to as the benchmark for forensic validation. Since the inception of forensic DNA there have been advances in technology allowing for examiners to obtain more information using less sample; the smallest stain can now be processed to yield information capable of uniquely identifying an individual. There has been tremendous success through the use of the CODIS system in providing a name to an unknown DNA profile, resulting in crimes being solved on a routine basis. The Federal Bureau of Investigation Science and Technology Branch (FBI-STB) has partnered with other US government agencies in the development of a prototype Rapid DNA instrument (R-DNA) capable of generating a full DNA profile from reference samples in 1 hour. This device will be fully compatible with the current CODIS system and requirements and ultimately allow for real-time searches of DNA databases. Deployment of this device will shift reference DNA collection to the booking stations, providing investigators and charging authorities release/hold notification based on DNA comparisons against an excess of seven million profiles. Examiners and other DNA scientists will then be able to focus increased attention on the more technically challenging crime scene samples. The overall vision and motivation behind this effort will be presented along with promising preliminary data.

Biography: Dr. McCurdy earned his bachelor's degree in Forensic Science from the John Jay College of Criminal Justice. His MPhil and PhD degree are both in Human Genetics and were earned from New York University. After graduate school, Les was a postdoctoral research fellow at the New York State Department of Health's Wadsworth Center where he worked on the development of microfluidic devices for cell sorting and subsequent single-cell genetic analyses. He joined the Federal Bureau of Investigation Laboratory Division in July 2002 and is currently the Acting Chief of the Mitochondrial DNA Unit.

This report is available at:
www.alaskapolicyforum.org/pubs/CrimeLab.pdf

ENDNOTES

[1] AO 2009-30 - An ordinance approving a long-term, non-competitive lease of Heritage Land bank parcels 3-032b and 3-060, restricted by a public purpose reverter clause…to the State of Alaska, Department of Public Safety, for a statewide services scientific crime detection laboratory.
www.muni.org/Departments/Assembly/legislation/2009%20Ordinances/ao2009-030.pdf
[2] www.gov.state.ak.us/omb/06_OMB/budget/PublicSafety/comp527.pdf
[3] www.gov.state.ak.us/omb/07_OMB/budget/PublicSafety/proj41600.pdf
[4] http://gov.state.ak.us/omb/09_omb/budget/PublicSafety/2009proj41600.pdf
[5] http://gov.state.ak.us/omb/09_omb/budget/CapBackup/FY08/proj50682.pdf
[6] http://gov.state.ak.us/omb/11_omb/budget/PublicSafety/Amend/2011proj41600.pdf
[7] Iowa Laboratories Facility, Ankeny, IA www.cpmi.com/projects/details.cfm?projectID=15
[8] The Iowa Crime Laboratory receives evidence from about 13,500 criminal cases a year. Alaska's crime laboratory received evidence from about 3,350 criminal cases a year. In FY2007 Iowa's CODIS unit added more than 20,000 convicted offender profiles to their DNA database, greatly exceeding the total number of DNA profiles that have been added to Alaska's database since its inception in 1999. The Iowa DPS Laboratory had 150 DNA database hits in 2008, while Alaska had only 12. Iowa's fingerprint unit had 547 latent print hits in FY 2007. The total number of latent fingerprints and palm prints identified using Alaska's automated identification systems in FY 2004 through FY 2007 was only 164.

Sources:
State of Alaska FY2009 Governor's Operating Budget Laboratory Services Component
www.gov.state.ak.us/omb//09_omb/budget/PublicSafety/comp527.pdf
State of Alaska FY2010 Governor's Operating Budget Laboratory Services Component
www.gov.state.ak.us/omb//09_omb/budget/PublicSafety/comp527.pdf
Iowa Department of Public Safety—Annual Report FY 2007
www.dps.state.ia.us/commis/pib/Annual_Report/2007/FY_2007_DCI.pdf
[9] L.A. Gets Nation's Largest Crime Lab (GovPro.com, 2007)
http://govpro.com/issue_20070101/gov_imp_66195/
[10] State of Alaska FY2010 Governor's Operating Budget Laboratory Services Component
www.gov.state.ak.us/omb//09_omb/budget/PublicSafety/comp527.pdf
[11]

Laboratory	Year Opened		sq ft	cost
Missouri State Highway Patrol Crime Lab	(2008)		30,000	$6,800,000
North Dakota State Crime Laboratory	(2008)		19,000	5,300,000
OK State Forensic Science Center	(2008)		86,000	30,000,000
Arizona DPS Tucson Regional Lab	(2009)		42,000	17,700,000
Phoenix Police Department Crime Lab	(2007)		104,000	38,000,000
		total	**281,000**	**$97,800,000**
Proposed Alaska Department of Public Safety Crime Lab			84,410	$92,550,000

Lab		Cost in $M	Size (sq. ft.)	Cost /sq. foot	Annual Caseload	Population Served	Cost per Person Served
N Dakota State Lab	(2008)	5.3	19,000	$281	~6,000	636,000	$8.33
Iowa State Lab	(2005)	17^	57,000	$298	~13,700	3,000,000	$5.70
Tucson Regional	(2009)	18	42,000	$429	~12,500		
Phoenix PD Lab	(2007)	38	104,000	$365	~26,500	1,500,000	$25.33
LA County Lab	(2007)	102	209,080	$488	~140,000	10,000,000	$10.20
Alaska proposed		**92.6**	**84,410**	**$1,097***	**~3,500**	**670,000**	**$138.13**

^ based on crime lab's share of an 176,000 square foot laboratory facility

*Includes 16,142 square feet of unfinished, shell space for future needs.

North Dakota Crime Laboratory
www.ag.state.nd.us/newsreleases/2007/10-04-07.pdf
Iowa State Crime Laboratory
www.dps.state.ia.us/commis/pib/Annual_Report/2007/FY_2007_DCI.pdf
Missouri State Highway Patrol Crime Lab
www.springfieldmo.gov/webapps/news/getStory.jsp?relid=2854
Tucson Regional Crime Lab
www.tucsoncitizen.com/ss/local/70011.php
Phoenix PD Lab
www.abc15.com/content/news/phoenixmetro/central/story/Crime-scene-investigators-enjoying-new-Phoenix-lab/JZxP08WdL0CS0AwzAxdEuw.cspx
OK State Forensic Science Center
http://newsok.com/article/3237451/
12

	Sedgwick County, Kansas Crime Lab (Y07)	State of Alaska Crime Lab (FY08)
Number of Employees	19	39
Cases Received	7,325	3,350
Drug Cases	4672	1229
NIBIN Cases	182	176
Trace Evidence Cases	45	18
DNA Cases	359	287
CODIS Hits (Y08)	78	12
Toxicology	1275 (full service)	532 (blood alcohol only)
Firearms Cases	546	116

The Sedgwick County Regional Forensic Science Center in Wichita, Kansas opened 1995. This 31,000 square feet building houses both a Crime Lab and the Pathology Division, including the Office of the District Coroner. The Pathology Division is organized into three sections: Pathology Administration, Medical Investigations and the Autopsy Service. In 2009, 628 autopsies were performed at the Sedgwick County Regional Forensic Science Center. For comparison purposes, Alaska's State Medical Examiner Office performed 347 autopsies in a building located across the

street from the crime lab. While this laboratory does not examine fingerprint evidence, type DNA database samples, or manage a State Breath Alcohol Program, it does provides comprehensive toxicology testing, a service that is outsourced in Alaska. In Y2008, the Kansas laboratory received 3,376 subpoenas for court appearances. The Alaska laboratory received 392 subpoenas for the first half of FY2010.
www.sedgwickcounty.org/rfsc/

[13] Crime Lab Replacement FY2011 Request
http://gov.state.ak.us/omb/11_omb/budget/PublicSafety/2011proj41600.pdf

[14] www.dps.state.ak.us/CrimeLab/stats.aspx

Discipline	Request Received FY06	Request Received FY07	Request Received FY08	Request Received FY09
Blood Alcohol	863	844	532	581
Breath Alcohol*	6572	6800	7765	8067*
Controlled Substances	1219	1200	1305	1118
Biological Screening	426	361	347	265
DNA Database	3951	NA	9109	7401
DNA	499	447	287	245
Field Technicians	37	278	206	128
Firearm/Toolmarks	101	105	100	119
Latent Prints	963	838	848	727
Toxicology	303	305	417	488
Trace	46	39	46	35

* While the crime laboratory manages the State Breath Testing Program, the actual tests are performed by police officers located around the state. No actual breath testing takes place at the laboratory.

[15] The Alaska State Legislature Committee Minutes, House Bill 313 (State of Alaska, 2008)
www.legis.state.ak.us/basis/get_single_minute.asp?ch=H&beg_line=00076&end_line=00411&session=25&comm=FIN&date=20080207&time=1340

[16] FBI Laboratory
www.fbi.gov/hq/lab/fsc/backissu/july2003/newlab.htm See also: www.fbi.gov/hq/lab/labhome.htm FBI unveils new crime lab at Quantico - FBI officially unveils its $130 million crime laboratory at Quantico Marine Corps Base today - By PAMELA GOULD - 4/25/2003 - http://fredericksburg.com/News/FLS/2003/042003/04252003/955552/

[17] House Finance Committee Hearing 2/7/08 -
www.legis.state.ak.us/basis/get_single_minute.asp?ch=H&beg_line=00076&end_line=00411&session=25&comm=FIN&date=20080207&time=1340

[18] House Finance Committee Hearing
www.legis.state.ak.us/pdf/26/M/HFIN2009-04-090842.PDF

[19] McClaren, Wilson, & Lawrie, Inc.
"'Design Standards' for forensic science facilities have been developed by the Sectioned (sic) States Department of Justice National Institute of Standards and Technology, in the government document entitled, Forensic Laboratories Handbook for Facility Planning, Design, Construction, and Moving. These design standards are embraced by the American Society of Crime Laboratory Directors (ASCLD). This document is recognized by forensic science laboratory directors nationwide as the standard for new forensic laboratory design."

[20] *Forensic Laboratories: Handbook for Facility Planning, Design, Construction, and Moving* (Gaithersburg: National Institute of Justice, 1998). www.ncjrs.gov/pdffiles/168106.pdf

[21] Lennard, Chris. "How Miniaturisation of Analytical Equipment Will Change the Nature of Crime Scene Examination" (Lyon: 13th INTERPOL Forensic Science Symposium, 2001).
www.interpol.int/Public/Forensic/IFSS/meeting13/Discussion/Discussion1.pdf

[22] Forensic Science Service launches mobile crime lab www.publictechnology.net/content/2910

[23] Miniaturization and Automation www.dna.gov/research/min_auto/

[24] "NEC Develops World's First Fully Integrated Portable DNA Analyzer " (2007).
www.nec.co.jp/press/en/0710/1501.html

[25] Scientists at the University of Hull develop smart 'Lab-on-a-chip' technology to fight crime in 21st Century (The University of Hull, 2006)
www2.hull.ac.uk/news/2006newsarchive/march/labonachip.aspx

---

[26] Portable DNA Testing For Crime Scenes Aided by New Microchip (Science Codex, 2008) www.sciencecodex.com/american_chemical_societys_weekly_presspac_jan_16_2008
[27] FULLY-INTEGRATED, MULTIPLEXED STR-BASED HUMAN IDENTIFICATION USING A SINGLE MICROFLUIDIC CHIP AND AUTOMATED INSTRUMENT https://www.promega.es/geneticidproc/ussymp20proc/oralpresentations/landersbienvenue.pdf
[28] "Real-time forensic DNA analysis at a crime scene using a portable microchip analyzer" (Forensic Science International Genetics, 2008). www.fsigenetics.com/article/S1872-4973(08)00050-1/abstract
[29] http://biometrics.org/bc2009/presentations/wednesday/McCurdy%20BrA%20Wed%201040-1055.pdf
[30] Senate Finance Committee 2/25/08 - www.legis.state.ak.us/basis/get_single_minute.asp?ch=S&beg_line=00072&end_line=00382&session=25&comm=FIN&date=20080225&time=0906
[31] Construction Cost Estimate (5/29/09) Livingston Sloan/Estimations (page 25 of 82).; DPS Scientific Crime Detection Laboratory Project Manual Vol. 1 (8/31/09) Livingston Sloan, Inc. (PDF page 464 of 708). The granite may recently have been dropped (M. Tanaka, verbal communication, 3/9/10)
[32] Alaska Scientific Crime Laboratory Project - Response to Program and Size Assertions (2/4/10) www.alaskapolicyforum.org/docs/CrimeLab/S45C-210020808060.pdf
[33] Crime Lab Improvement www.gov.state.ak.us/omb/03_OMB/budget/PublicSafety/proj35882.pdf
[34] State of Alaska, Alaska State Public Health Laboratories www.hss.state.ak.us/dph/labs/chemistry/default.htm
[35] [35] American Academy of Forensic Sciences, Resources > Choosing a Career www.aafs.org/default.asp?section_id=resources&page_id=choosing_a_career#QD
[36] www.dna.gov/funding/convicted/outsourcing-contracts/#mce_temp_url#
[37] 2009-2014 MOA Capital Budget - APD HEADQUARTERS EXPANSION - PHASE II - This project addresses the renovation of the police department Headquarters Building and construction of essential support facilities on the existing police campus. www.muni.org/Departments/budget/capitalBudgets/2009%20Ppsd%20Cap/Police.pdf
[38] "LINCOLNSHIRE WORLD FIRST USING DNA TECHNOLOGY" (Forensic Science Service, 2005).
[39] www.gov.state.ak.us/omb/06_OMB/budget/PublicSafety/comp527.pdf
[40] www.gov.state.ak.us/omb/07_OMB/budget/PublicSafety/proj41600.pdf
[41] http://gov.state.ak.us/omb/09_omb/budget/PublicSafety/2009proj41600.pdf
[42] Comments and annotations by Chris W. Beheim to 2007 Space Needs Assessment, State of Alaska Department of Public Safety, Statewide Services Crime Laboratory, Anchorage, Alaska by McClaren Wilson & Lawrie, Inc.(15 October 2007) www.alaskapolicyforum.org/docs/CrimeLab/ACL_2007_SpaceNeedsBEHEIM.pdf
[43] http://gov.state.ak.us/omb/09_omb/budget/CapBackup/FY08/proj50682.pdf