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20	Connecting Habitats and Improving Safety	Rhonda Brooks 360-705-7945
22	Identifying and mitigating the effects of shade imposed by over water structures on migratory juvenile salmon.	Rhonda Brooks 360-705-7945
25	LRFD Procedures for Geotechnical Seismic Design – Phase I	Kim Willoughby 360-705-7978
27	Concrete Performance using low Degradation Rock	Kim Willoughby 360-705-7978
29	Analyzing the characteristics of property values to improve Right of Way Acquisition Estimates	Rhonda Brooks 360-705-7945
30	HOV Action Plan, Phase One – A study to identify and evaluate improvements and policy modifications that improve HOV system performance, especially on I-5.	Doug Brodin 360-705-7972
33	Measuring the impact of employer-based transportation demand management (TDM) strategies on transportation system performance	Kathy Lindquist 360-705-7976
35	Building a Resilient Freight System in the Washington Transportation Plan – Phase 'Assess Probability of Disruptions Within Washington State's Freight System and Analyze Transportation Impacts of Potential Disruptions'	Doug Brodin 360-705-7972

38	Development of Consistent and Reliable StatewideTraffic Data Analysis Tools Based on Customers Needs and Expectations	Doug Brodin 360-705-7972
40	“Washington State Ferry (WSF) Passenger Demand and Lost Revenue Analysis”	Rhonda Brooks 360-705-7945
42	Pooled Fund Study to Determine the Feasibility of Creating a Vehicle Length Classification Scheme	Kathy Lindquist 360-705-7976
43	Data Integration and Document Management Using Ontologies	Kathy Lindquist 360-705-7976
45	I & F RAC Quick Response Fund	Kathy Lindquist 360-705-7976
46	I & F RAC Contingency Fund	Kathy Lindquist 360-705-7976

OPERATIONS RAC

PROBLEM TITLE

Determine the longevity and cost effectiveness of corrosion inhibitors added to liquid and solid deicing chemicals

RESEARCH PROBLEM STATEMENT

Public agencies throughout the Northwest buy and use inhibited deicing chemicals in an attempt to reduce the corrosive effects of the deicer they use. Organic inhibitors such as phosphates and carbohydrates are added to the deicing chemicals to reduce the corrosive effects of these deicers. We know and have documented laboratory corrosion tests that we can reduce the corrosive effects of all deicers by 70% or more by the addition of inhibitors. What we do not know is how long in a field environment the inhibitors stay with the chloride after application.

RESEARCH OBJECTIVE

The objectives are to:

- Determine if the added inhibitors stay with the deicer chemical in a field environment long enough to make them economical (i.e. are they non-corrosive to vehicles as well as to the steel within bridges and pavements well after application)
- Determine how long it takes the inhibitors to be broken down and leave the deicer after application
- Determine the effects to the inhibitors from exposure in a field environment
- Determine how long the inhibitors are present and active while being stored at open and covered sites, and how much is lost just due to exposure to the elements
- Determine if inhibitors contribute to freezing point suppression and if they increase the effectiveness of the deicers
- Determine any adverse effects the inhibitors have on water bodies, pavements surfaces and other adjacent roadside areas

Work Plan

1. Locate an unoccupied parking lot, airport or other large paved surface. Everything can be reproduced except the effect of traffic in this type of an area.
2. Have access to a Road Weather Information System to document different weather conditions.
3. Apply corrosion inhibited liquid Magnesium Chloride, Calcium Chloride, Sodium Chloride and corrosion inhibited Sodium Chloride (solid) to pavement surface.
4. Develop procedures to mark and track inhibitors added to the deicer.
5. Determine concentration when applied, then track hourly and daily levels to determine losses (both short term and long term), under all different weather conditions.

A technical committee will be formed from pool fund participants (the Pacific Northwest Snowfighters) and this committee will determine the details of evaluation and reporting. A technical advisor should also be hired with field

experience, funded by pooled funds to work directly with the Research Institute to provide ongoing assistant and assurance that this project is completed and the result will support future business decisions.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:

$100,000 (total of $200,000)

It is intended this money would be contributed to Pacific Northwest Snowfighters Pooled Fund. We would solicit other participating States to contribute additional funding also. Total project cost is estimated at $200,000. It is recommended this pooled fund project be developed and managed by a technical committee chosen from pooled fund contributors to Pacific Northwest Snowfighters.

Research Period:

36 Months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

Most public agencies in the Northwest are seeing unprecedented cost increases to all the deicer products being used. This research will prove one way or the other, if the inhibitor stays with the deicers in a field environment or leave very soon after application. This will provide necessary information to support an inhibited deicer program or justification to stop paying the additional money for the added inhibitors. If the inhibitors are not staying with the deicer, and this research supports a change in program, the estimated saving to each agency currently using inhibitors will be substantial.

PERSON(S) DEVELOPING THE PROBLEM STATMENT

Chris Christopher/Tom Root

SUGGESTED PROBLEM MONITOR

Tom Root/PNS TAC

DATE AND SUBMITTED BY

October 2, 2006
Tom Root

PROBLEM TITLE
Loss of Service Life in Bridge Deck Shrinkage Cracking

RESEARCH PROBLEM STATEMENT
All of the WSDOT bridge decks constructed crack due to concrete shrinkage. The cracks develop usually in 48 hours after deck concrete is placed and are transverse and full deck depth.

RESEARCH OBJECTIVE
Develop a mix design for bridge decks to minimize shrinkage cracking.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$100,000
Research Period:	12 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
The cracks in decks provide an avenue for the salts and water to penetrate the concrete and substantially diminish decks' service life. A mix with reduced tendency to shrinkage cracking can address alleviate this problem and provide for added service life.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Mohammad Sheikhizadeh

OTHER OFFICES LIKELY TO HAVE INTEREST

RECOMMENDED PROBLEM MONITOR
Mohammad Sheikhizadeh

DATE
Sep. 18, 2006

PROBLEM TITLE
Pooled Fund Safety Analysis – Continuation Funding

RESEARCH PROBLEM STATEMENT
Why is this an issue for WSDOT? What is the problem?

WSDOT is the lead state in a pooled fund safety analysis project established with Texas Transportation Institute (TTI). This project has 7 States contributing funding and conceptual research topics. Crash testing of safety hardware is a major component of this pooled fund program; however this program studies safety issues, and crash testing is not always essential for safety evaluations. Topics are discussed with TTI and voted on by a committee of state representatives. When this pooled fund project was conceived and implemented, Wisdom's financial contribution was assembled from funds that could be gathered at the time. To ensure continued WSDOT participation in this program, a more dependable funding source is needed.
This project provides exceptional opportunities for WSDOT to leverage funds and to influence priorities. Over the course of one year of this pooled fund two of Wisdom's topics were selected with a combined value of $120,000. In this instance WSDOT gets $120,000 worth of research on a $50,000 investment. WSDOT also get the additional benefit of other research projects that were lower priority topics for us, but of greater interest to other states.

RESEARCH OBJECTIVE
How is research anticipated to contribute to a solution?
The objective of this research is to provide a stable, reliable funding source for continued participation in a pooled fund project to research safety issues.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$100,000 ($50,000 per year)
Research Period:	Biennium

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
What do you hope to gain from the research? How do you expect the research will be used?
Participation in this pooled fund program gives WSDOT the ability to address emergent needs more quickly, by leveraging funds from other states. Constant changes in the size and type of vehicles on the roadway, requires periodic alteration in crash test criteria. The evolution of the crash test criteria creates a need to develop new safety products or test older products with updated vehicles.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Name, email address, and phone number.
Dave Olson
olsonda@wsdot.wa.gov
360-705-7952Dick Albin
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360-705-7451

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
Traffic operations, Maintenance

RECOMMENDED TECHNICAL MONITOR

Dick Albin

DATE
8/2/2006

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

_X___ National ____ Regional or Multi-state ____ Washington Only

PROBLEM TITLE
Quantitative Security Risk and Resource Allocation Model

RESEARCH PROBLEM STATEMENT
Why is this an issue for WSDOT? What is the problem?
The WSF Security Committee, comprised of representatives from Washington State Ferries (WSF), Washington State Patrol (WSP), and the U.S. Coast Guard, has been overseeing the application of security measures at WSF since shortly after September 11, 2001. Prompted by current and evolving regulatory requirements, recent detailed discussions have centered on the optimum method for allocation of resources to best reduce the risk of a Transportation Security Incident at WSF, particularly related to the introduction of a Vehicle Born Improvised Explosive Device (VBIED) on a WSF ferry.

The Coast Guard has established a regulatory baseline for vehicle screening by articulating the type of acceptable screening methodologies and the minimum rate of screening. However, because the types of acceptable screening have widely varying probabilities of both detection and deterrence, the impact a specific screening protocol has on the relative vulnerability to a VBIED, and the corresponding relative risk reduction associated with the measure, is not adequately quantified at present. Consequently, the regulatory baseline established by the chosen performance measure, vehicle screening, is not truly a measure of the relative risk reduction, which makes it very difficult for the operator to make prudent decisions regarding the application of the best security measures.

As a result of these challenges, WSF submits this research proposal to develop an analytical tool for use in defining the most effective approach to vehicle security screening and best use of limited resources. Specifically, WSF proposes the development of an analytical tool aimed at quantifying the risk reduction potential of various measures and various allocations of resources, with the ultimate goal of preventing the introduction of a VBIED on a WSF ferry. This proposal is not a risk assessment. Rather, it is a proposal to build on the existing risk assessments to better quantify a risk reduction algorithm and in so doing establish a tool that will greatly improve the distribution of limited resources to the greatest systemic benefit.

RESEARCH OBJECTIVE
How is research anticipated to contribute to a solution?
The goal of this proposed project would be to establish a quantitative means by which relative risk reductions could be calculated for a layered/systemic set of security measures, and through which resources could be most appropriately assigned. The research project would necessarily involve the collection and use of existing statistics and probabilities associated with screening methods and measures, analysis of available data such as WSF traffic (passenger and vehicle) patterns, quantification of various risk reduction aspects such as detection levels and the affects of deterrence, and integration of these statistical measures into a comprehensive, analytical risk reduction and resource allocation model.

The end result of this project would be an extremely useful quantitative tool that would help WSF, WSP and the Coast Guard makes informed asset/resource allocation decisions and balances the localized risk between the various routes, while optimizing systemic risk reduction.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$100K
Research Period:	12 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
What do you hope to gain from the research? How do you expect the research will be used? Who else may have interest in this research?
This research project would greatly assist WSF and WSP allocate the limited security assets and resources to realize the greatest safety and security benefit to our vessels, crews, and traveling public. It would also place WSF and WSP in the position to quantitatively justify the level and allocation of state resources and stave off potentially costly security additions or upgrades. The concepts used in the development of a risk reduction and resource allocation model for WSF have been endorsed by the Coast Guard and are trend setting on a national scale. They would likely have broad application to a variety of transportation modes, but would undoubtedly have direct application to other high capacity vehicle ferry operations through out the nation.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Name, email address, and phone number.
Scott Davis, Washington State Ferries
davissc@wsdot.wa.gov
206-515-3905

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
John Himmel, WSDOT Emergency Management and Security Coordinator

RECOMMENDED TECHNICAL MONITOR
Scott Davis, Washington State Ferries

DATE
October 2, 2006

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National __x__ Regional or Multi-state ___x_ Washington Only

PROBLEM TITLE
Development of a Consistent and Reliable Statewide Traffic Datamart Based on Customers Needs and Expectations

RESEARCH PROBLEM STATEMENT
This research targets improvements to data, data collection, and data management that will make WSDOT traffic data across the state better and more consistent. There are thousands of loop data sights in Washington State that are used for operations but not used for planning purposes because the accuracy does not meet the needed threshold. It is essential to improve loop data accuracy to make better use of existing loop detectors. Better data collection will improve operations and performance measurement. Being able to use all data stations will provide a wealth of information for better planning, project scoping, and it will also prevent the need for duplicate equipment, construction, and maintenance.

RESEARCH OBJECTIVE
The research team will hold a WSDOT data conference in which data providers and data users will come together and align goals, expectations and needs. The needs of each user will be matched to data availability and accuracy and data sets will be determined. One longtime undecided question is what data tool will provide the best service to data users? This research will answer whether WSDOT should move forward statewide with PEMs, CDR, TDAD or some other available tool.

This project will develop an online analysis tool for identifying the operational state of data stations and potential uses of data collected by the stations. Currently, it is difficult to determine if the source data is “bad.” In fact, we have no commonly accepted definition of “bad” because it varies from user to user and because of the lack of ground-truth data at detector locations. This project will develop a method for loop data quality control and create a consistent or “platinum” data set based on customers’ requirements. Online ramp balancing will be used in this tool. The online ramp balancing will occur by first identifying good data stations and then balance all the stations off the good data stations.” Error propagation analysis may be used.

After this assessment and analysis an implementation process will be defined. This process will identify what WSDOT resources are needed to maintain and support collecting better data and providing consistent use of the data. It will determine the best method to detect loop malfunctions determine loop accuracy and notify of loops needing adjustment. This might include costs to have someone use the existing UW Advanced Loop Event Data Analyzer (ALEDA) system to calibrate loops or determine repairs. This will be presented to the research advisory committee and research executive committee. This effort will provide an easy method to prioritize repairs and maintenance of data stations.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: $100,000 (I & F RAC also funded at $100,000 for a total from WSDOT of $200,000; this $200,000 will be used a match to request another $133,000 from TransNow in the spring).

Research Period: 24 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

There are multiple projects with the possibility of early wins. Providing a consistent data set that works for all organizations across WSDOT will help ensure accurate performance measurement, better support for pavement management, more accurate operations, and provide a much bigger data set for everyone to use.

The project is urgent because TDO and Traffic are proposing construction of new data stations and these efforts need to be aligned. There is potential to align and prioritize maintenance activities to support all groups dealing with traffic data.
This project will deploy any applications developed. During the data conference involved parties will be asked to provide a commitment to deployment for the products developed. Approached will be discussed and developed with those involved. The application/s will be designed so there is minimal cost in deployment. This will occur by building it stand alone pulling data from existing collection systems or databases depending on the application or by building it into an existing UW product like CDR or TDAD.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Mark Hallenbeck, tracmark@u.washington.edu, 206-543-6261
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Yinhai Wang, yinhai@u.washington.edu, 206-616-2696
John Rosen, rosenj@wsdot.wa.gov, 360-570-2373
Doug Brodin, brodind@wsdot.wa.gov, 360-705-7972
Morgan Balogh, baloghm@wsdot.wa.gov, 206-440-4485

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
Traffic Data Office
Office of Strategic Assessment
Traffic Office
Materials Lab Office

RECOMMENDED TECHNICAL MONITOR
Morgan Balogh

DATE
October 5, 2006

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National ____ Regional or Multi-state ____ Washington Only

PROBLEM TITLE
Efficient Incident Response Program Operations

RESEARCH PROBLEM STATEMENT
The current Incident Response program has four funded operational elements:

- WSDOT IR program: State operated incident response and service patrols. These operate in all six regions

- WSP Cadets: WSP service patrols which operate in the NW and Olympic Regions.

- Tow Service Patrols, (RTTOs): Contracted private tow company service patrols in the NW and Olympic Regions.

- Media Assistance Van (MAV): Contracted private media service patrol which operates in the Olympic Region

The total biennenial costs for these four operational elements are over $6 million.

The last time the IR program was evaluated was in 1997, at that time the program was much smaller and less complex then it is today, comprised of only a handful of WSDOT operated units. That evaluation, performed by TRAC noted that there was no process in place to examine how and were the IR resources where deployed from a needs basis. Such a process still does not exist

Work is needed to insure that the deployment of all elements of this program is being done in the most efficient way and based on some expected level of service on the road.

RESEARCH OBJECTIVE
The objectives of this project are to:

- Perform a national review of the state of the practice for IR and service patrol evaluations and deployment practices.
- Provide a comprehensive inventory of the existing program, to include who is covering where, what and how they perform their tasks. This inventory will include coverage areas, equipment, and training.
- A comparative analysis of all 4 program elements to determine how each is performing and to document the level of service each is providing. This analysis will also look at regional differences.
- The development of a needs based system to guide the department on how to select the proper IR program elements based on desired costs and service levels.
- The development of a methodology to help the department best deploy the IR program elements to provide the highest level of service at the most efficient cost.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$75,000
Research Period:	12 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

This project will help the department operate the IR program in the most efficient manner possible. It is urgent that we do a comprehensive look at the operations of the IR program.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Bill Legg

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
All Regions and the Maintenance Office

RECOMMENDED TECHNICAL MONITOR
Bill Legg and Rick Phillips

DATE
10/10/06

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National ____ Regional or Multi-state ____ Washington Only

PROJECT DELIVERY RAC

PROBLEM TITLE

Seismic Assessment and Retrofit of WSDOT Bridges

IRESEARCH PROBLEM STATEMENT

There are over 634 WSDOT owned bridges built prior to 1980 in the Puget Sound Region with multiple concrete columns that may require substructure seismic retrofit. There are also 160 bridges with single columns and 22 bridges with prestress hollow core pile/columns. A seismic analysis on a bridge from these three types is needed to validate some of the findings from the January 2006 WA-RD 639.1 report.

RESEARCH OBJECTIVE

WSDOT will select 3 bridges in the Puget Sound Region for this research. The research will use the commercially available software known as "ADINA" to perform a time history analysis on each bridge. Retrofit alternatives will be explored based on the findings.

Three types of bridges will be used for this research:

1) A bridge with multiple column piers
2) A bridge with single column piers that has a steel jacket
3) A bridge with prestress hollow core pile/columns

Work Plan

The research will require the purchase and training on the "ADINA" computer software. Researcher will work with WSDOT Engineer to agree on boundary assumptions such as the type of soil structure interaction. WSDOT Engineer will select the three bridges for the research and provide plans to the researcher.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$150,000
Research Period:	24 Months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

Results from the research will be used to determine future seismic retrofit alternatives for similar bridges.

PERSON(S) DEVELOPING THE PROBLEM

DeWayne Wilson

SUGGESTED PROBLEM MONITOR

Bijan Khalegi / New WSDOT Seismic Retrofit Specialist

DATE AND SUBMITTED BY

October 2, 2006 Bridge and Structures Office

PROBLEM TITLE

New Quality Verification Method for Acceptance of Drilled Shafts

RESEARCH PROBLEM STATEMENT

All of the wet method drilled shafts are typically accepted based on successful results of the Cross Sonic Testing (CSL). This method of Quality Assurance (QA) testing can only verify the quality of concrete inside the shaft core and does not provide for verification of adequate concrete cover over the shaft rebar cage. There is a severe lack of reliable testing methods among the States to verify the quality of the entire drilled shaft concrete.

LITERATURE SEARCH SUMMARY

There is no prior research conducted to develop a reliable testing method for drilled shafts.

RESEARCH OBJECTIVE

This research proposal will:

- Determine test methods that may be capable of testing for core concrete quality as well as the presence of adequate concrete cover outside the shaft rebar cage
- Determine the reliability and cost-effectiveness of those test methods

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$100,000
Research Period:	18 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

This testing deficiency can lead to acceptance of shafts by owners that are structurally deficient and susceptible to early rebar corrosion leading to significant reduction in life expectancy of the foundation. WSDOT, on several occasions, has accepted shafts based on the successful CSL result and accidentally determined later that the shaft rebar cover was inadequate. The attached picture shows one of such shafts that passed the CSL testing and was later found to lack any rebar cover.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

Mohammad Sheikhizadeh

OTHER OFFICES/STATES LIKELY TO HAVE INTEREST

All States/owners that use drilled shafts for foundation support

PROBLEM MONITOR

Mohammad Sheikhizadeh

DATE AND SUBMITTED BY

September 18, 2006
Mohammad Sheikhizadeh

PROBLEM TITLE
Crash Testing Concrete Barrier with Large Scuppers

RESEARCH PROBLEM STATEMENT
Precast concrete barrier is regularly used along our highways to shield the motorist from roadside hazards. Barrier placement frequently impacts roadway drainage, resulting in a need for collection and dispersion through a subsurface system of inlets and pipes. Subsurface drainage systems require treatment of the runoff prior to discharge. If water is able to sheet-flow off the roadway, the need for subsurface drainage facilities is eliminated and the runoff can be filtered through roadside vegetation. Openings or "scuppers" can be cast into the base of the barrier to allow the drainage to sheet-flow off the roadway, but these scuppers may impact the barrier's performance. Crash testing is needed to ensure that this barrier meets crash test requirements outlined in NCHRP Report 350.

RESEARCH OBJECTIVE
Two-phases of evaluation are recommended to gauge performance which barrier stability and with snagging in the scuppers. Testing with an F-Shape barrier is recommended because its lower center of mass would likely be more resistant to overturning on impact. In phase one, computer simulation using finite element analysis is recommended to determine the probability of success of the physical crash test. Because the physical crash test is more expensive, that is recommended as phase two. Phase two would not proceed if phase one indicates a low probability of successful performance. This research would produce a report detailing how the barrier performance compares with the NCHRP Report 350 requirements.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$20,000 for phase 1 and $40,000 to $75,000 for phase 2 - depending on whether one or two actual crash tests are needed.
Research Period:	6 *months*

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
If this test is successful, this barrier design may be appropriate as a means to reduce the investment in drainage and grading where an unrestrained rigid barrier system is utilized. Allowing water to sheet flow off the roadway and filter through roadside vegetation has the potential for saving ten of thousands of dollars on a single project and also reduce project delivery time.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Dave Olson
olsonda@wsdot.wa.gov
360-705-7952

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
Traffic Operations, Maintenance, Environmental

RECOMMENDED TECHNICAL MONITOR
Rod Erickson
ericksr@wsdot.wa.gov
360-705-7246

DATE

9/21/2006

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

_X___ National ____ Regional or Multi-state ____ Washington Only

PROBLEM TITLE

Highway Runoff Treatment System Performance

RESEARCH PROBLEM STATEMENT

Stormwater management is a complex task with a variety of constraints and regulatory drivers[1]. It spans numerous technical disciplines including hydraulics, hydrology, geology, and water quality. The linear nature of highways often poses siting constraints for conventional stormwater management approaches. Research is needed to refine the design criteria for the *Natural Dispersion* BMP for transportation corridors, quantify the flow attenuation capabilities of certain runoff treatment BMPs, and to quantify the stormwater treatment and flow attenuation capabilities of soil amendment and vegetative restoration methods; all to increase the effectiveness of BMPs and reduce their cost.

RESEARCH OBJECTIVE

WSDOT Environmental Services Office's *Stormwater Research Strategy* calls upon an interdisciplinary technical committee to identify stormwater-related research priorities that will give the highest rate of return for WSDOT's limited research capital. The priorities identified by this technical committee are as follows:

- Identify the effects of highway shoulder slope, length, and angle, and contributing paved road area on the *natural dispersion* approach for treating highway runoff. Evaluate the appropriateness of, and recommend changes to, the *Highway Runoff Manual's* (HRM) existing *natural dispersion* design guidance.
- Quantify the degree to which the HRM's existing stormwater treatment system designs can be modified to reduce highway runoff discharges to surface waters through absorption and/or infiltration, which will allow affected BMPs to serve a dual purpose.
- Quantify the water absorbing and pollutant removal properties of:
    - Compost blanket applications on highway shoulders and medians.
    - Vegetation restoration methods specified in WSDOT's *Roadside Manual*.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$ 300,000
Research Period:	24 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

WSDOT is financially constrained to meet existing NPDES stormwater permit requirements, which will get only more stringent with the next permit to be issued in 2007. In order to maximize environmental protection and meet regulatory obligations in a cost-effective manner, WSDOT needs to increase the performance of its stormwater treatment methods and reduce capital, operations, and maintenance costs

[1] Examples: WSDOT's NPDES municipal permit requires the agency to conduct stormwater research, but currently no legislative appropriation exists to carry out this obligation; National Marine Fisheries Service and US Fish and Wildlife Service are pushing for extremely low dissolved copper concentrations in stormwater discharges that are unattainable with existing treatment technologies; and WSDOT's stormwater discharges must meet existing state and federal water quality requirements.

associated with those methods. This will result in less runoff-generated pollution discharging to receiving water bodies. The knowledge gained from this research is expected to result in a very significant return on the investment by using the information to: 1) improve design guidance in the HRM; 2) enhance design tools used to size stormwater systems; 3) lower associated operations and maintenance costs; and 3) promote more efficient alternatives to existing stormwater treatment designs.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

David Batts, *Stormwater Technical Review Committee* coordinator
Larry Schaffner, Stormwater Team Leader
WSDOT Environmental Services Office

OTHER OFFICES LIKELY TO HAVE INTEREST

WSDOT Regions
WSDOT Construction
WSDOT Design
WSDOT Maintenance
WSDOT Highway and Local Programs
Washington State Department of Ecology
Federal Highway Administration
National Marine Fisheries Service
US Fish and Wildlife Service
Local municipalities and road departments
Other state transportation departments

RECOMMENDED PROBLEM MONITOR

David Batts
WSDOT Environmental Services Office

DATE

September 29, 2006

PROBLEM TITLE
Connecting Habitats and Improving Safety

RESEARCH PROBLEM STATEMENT
There is a growing understanding of the impacts of roads on wildlife and habitat. This is important from a natural resource conservation perspective as well as a matter of public safety. The 2005 publication by the National Academies of Sciences "*Assessing and Managing the Ecological Impacts of Paved Roads*" identifies how roads can constitute barriers to animal movement, lead to habitat loss, and in some cases can contribute to the decline of imperiled wildlife populations. Animal-vehicle collisions pose a serious hazard for motorists as well as a significant source of wildlife mortality. WSDOT annually records about 3000 collisions with deer and elk on state highways.

Washington is biologically diverse state with over 650 vertebrate species. More than 40 of these are currently designated under the federal Endangered Species Act. The state highway system occurs in the majority of the habitat types of the state. There is strong public support for transportation solutions that include ecological considerations as part of meeting transportation objectives.

Measures such as enlarged stream crossing structures, wildlife crossing structures, animal detection and warning systems, and fencing have proven useful in reducing some of the problems, but these need to be applied an a strategic manner to get the best gain. Significant effort has been made in a few areas of the State, such as the I-90 Hyak to Easton corridor, but in Washington, the attention has largely been opportunistic, and project by project. To provide the best benefit for habitat connectivity as well as helping reduce the potential for animal-vehicle collisions, a system for identifying and prioritizing key areas statewide is needed. This can then be used to develop location specific solutions in a strategic manner.

RESEARCH OBJECTIVE
While there is a growing body of knowledge about how to better address wildlife habitat connectivity Research is needed to help identify high priority focus areas in the state for addressing wildlife connectivity statewide and to make preliminary recommendations for addressing connectivity. Working with existing GIS data, and other existing information including local expert knowledge, it would be possible to develop a habitat connectivity plan for the highway system. This would include where notable habitat linkage areas exist for large terrestrial animals such as deer, elk and cougar, as well as for other species that are of special conservation management concern. This prioritization should also note localities that have management for protecting nearby habitat and where significant records for animal vehicle collisions occur.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$125,000
Research Period:	18 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
This effort would provide a basis for determining the locations of key focus areas for connectivity. This could be used in project planning and scoping to identify where the best opportunities for improving connectivity and reducing animal vehicle collisions are and allow these to more be easily included in project planning. With a well developed system for prioritization, WSDOT and better understand the scope and scale of the issue and develop strategies for improvements. This would also help with demonstrating compliance

with SAFTEA LU section 6001 that directs states to incorporate natural resource information into transportation planning.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Paul Wagner, Biology Branch manager
Marion Carey, Fish & Wildlife Program Manager
WSDOT Environmental Services Office

OTHER OFFICES LIKELY TO HAVE INTEREST
WSDOT Regions and Modes
WSDOT Planning
WSDOT Design
WSDOT Maintenance
WSDOT Highways and Local programs, MPO's /RTPO's
WA Department of Fish & Wildlife
US Fish & Wildlife Service
US Forest Service
Other State Departments of Transportation

RECOMMENDED PROBLEM MONITOR
Paul Wagner, Biology Branch manager
Marion Carey, Fish & Wildlife Program Manager
WSDOT Environmental Services Office

DATE
October 1, 2006

PROBLEM TITLE
Identifying and mitigating the effects of shade imposed by over water structures on migratory juvenile salmon.

RESEARCH PROBLEM STATEMENT
Demand for ferry service in Washington State is increasing, and as a result there is pressure to expand ferry terminal infrastructure, and refurbish aging docks. Consequently, an opportunity and need exists to assess WSF terminal effects on nearshore resources through scientific assessments, and develop new technologies to mitigate impacts.

In June 2006 Battelle completed a WSDOT funded study to identify potential impacts of over water structures (OWS) on the migratory behavior of juvenile salmon. This was the third in a series of scientific investigations on the problem of over water structures and effects on young salmon. Results indicated the shadow cast by OWS alters the behavior of juvenile salmon. The 2005 field study suggested a need for additional research designed to collect quantitative data through manipulative field experiments. A study of this nature would apply artificial lighting to an existing ferry terminal to determine the degree to which artificial light facilitates movement patterns and migratory behavior of juvenile salmonids under OWS.

RESEARCH OBJECTIVE

I. Investigate the feasibility of fiber optics as an appropriate technique for artificial light enhancement under ferry terminals.
II. Apply shade reducing techniques to the Port Townsend ferry terminal to monitor changes in environmental conditions as well as the response from juvenile salmonids.
III. Utilize multiple observational and tracking techniques to determine the behavior of salmon as they approach an OWS under normal, shaded conditions compared to artificial light treatments.

Research Tasks

Phase I. Laboratory Pilot Study

Goal:
Test the feasibility of fiber optics as an appropriate technique for artificial light enhancement under docks.

Research Questions:

- Does the application of fiber optics in the marine environment mitigate shade imposed by OWS?
- Can the artificial light produced from fiber optics be manipulated to minimize shade while mimicking natural light conditions?
- What is the behavioral response of juvenile salmon to the installation of fiber optics at OWS?

Objectives:
The application of fiber optics at OWS is a newly tested concept. Approaching the fundamental questions outlined above through an *in situ* pilot study at the Battelle Marine Science Laboratory will allow researchers to determine the feasibility of this technology prior to the

implementation at the Port Townsend ferry terminal. The study would involve testing multiple design and methodological techniques related to optical routing configuration, the manipulations of disks, reflectors, and angle position. Quantitative data gathered coupled with modeling techniques will be used to predict lighting configuration that best minimizes shade barriers to migrating juvenile salmonids.

Phase II. Field application of fiber optics at the Port Townsend Ferry Dock

Goal:
Minimize shade caused by the Port Townsend ferry dock by retrofitting the terminal with fiber optic cables.

Research Questions:

- Does the arrangement of fiber optics at the Port Townsend ferry dock minimize shade and mimic natural photosynthetic active radiation (PAR)?

Objectives:
Utilize the methodologies developed during the pilot study for application at the Port Townsend ferry dock. Obtain quantitative measurements of PAR and light attenuation at discrete depth increments to validate predictive models and account for inherent environmental variability.

Phase III. Fish Behavior

Goal:
Systematically address the behavioral responses of juvenile salmon to shadows cast by OWS.

Research Questions:

- Does the behavioral response of salmon to OWS manipulated with fiber optical lighting differ from non-manipulated dock conditions?

Objectives:
Use a combination of visual observations (snorkeling) and video data collection to address questions of fish behavior and movement across shade barriers. Sampling methods will be designed to account for multiple types/strengths of shadows. Video cameras will be installed along/beneath the over-water structure to supplement observational techniques and to defray the labor costs associated with snorkeling. Video will also be positioned at the end of the terminals to capture movements where snorkeling is not feasible. Review of video footage may help to determine the influence of terminals versus the influence of vessel traffic at the ends of docks. In circumstances that may benefit data collection, surveys with snorkelers and video will be combined to increase the resolution of both types of observations. Use of infrared lights or other means to brighten the video and light manipulation, using fiber optics will also be evaluated.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Phase I: Laboratory Pilot Study: 5 – 6 months
$45,000

Phase II: Field application of fiber optics at the Port Townsend Ferry Dock: 10-12 months
$95,000

Phase III: Fish Behavior at PT using visual observations (snorkeling/video): 10-12 months
$80,000

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
This research will provide much needed information to help us understand impacts of OWS and identify the most effective technologies and designs to minimize those impacts. This information is critical for the various upcoming projects that are proposing OWS (Port Townsend Ferry Terminal, Keystone Ferry Terminal, Bainbridge Ferry Terminal, Southworth Ferry Terminal, Seattle Ferry Terminal, SR 520 Bridge).

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Ellie Ziegler
Washington State Ferries

Battelle Pacific Northwest Labs

OTHER OFFICES LIKELY TO HAVE INTEREST
Urban Corridors Office (SR 520 bridge and Coleman Dock projects)
Environmental Services Office
Bridge Office

RECOMMENDED PROBLEM MONITOR
Ellie Ziegler
Washington State Ferries

DATE
September 28, 2006

PROBLEM TITLE:
LRFD Procedures for Geotechnical Seismic Design – Phase I

RESEARCH PROBLEM STATEMENT
Design of foundations, walls, and other geotechnical elements of transportation infrastructure have migrated to LRFD basis using concepts of reliability analysis. This transformation has allowed more uniformity of failure risk, thereby producing more efficient use of design, construction and maintenance funds.

Current procedures for seismic design of geotechnical elements are not LRFD- or reliability-based. For example, recent WSDOT-supported research at the University of Washington has shown that consistent application of conventional procedures for liquefaction evaluation provides significantly inconsistent actual risks of the occurrence of liquefaction; using current procedures, WSDOT engineers are being required to effectively design structures on the Pacific coast for a factor of safety 1.5 times larger than the factor of safety used in Seattle.

Reliability-based design requires statistical characterization of loads, capacities, and the performance of engineered systems in response to loading. For seismic loading, the development of such procedures requires methods that account for the temporal distribution of loading, i.e. for how often earthquakes of different magnitudes occur on different faults. They must also account for the effects of those earthquakes on ground shaking, and for the response of engineered systems to those levels of ground shaking. Each of these elements of design are uncertain, so uncertainty in loading, response given loading, and damage (i.e. performance) given response must all be characterized. These quantities must then be combined in a manner that allows development of load (demand) and resistance (capacity) factors that achieve a specified probability of failure (or of achieving some other performance level).

RESEARCH OBJECTIVE
Recently developed procedures for performance-based earthquake engineering allow probabilistic descriptions of seismic capacity and demand, and therefore allow development of reliability-based design procedures. Using probabilistic seismic hazard analysis (PSHA), the “time element” (i.e. the effects of rates of recurrence of earthquakes of different sizes from different sources) of earthquake loading can be accounted for. These procedures have been extended in recent WSDOT-supported research at the University of Washington to handle liquefaction problems, which have the additional complication of being related to earthquake magnitude in addition to ground motion amplitude.

The objective of the proposed research would be to develop a framework for computing load and resistance factors for the seismic design of geotechnical elements of transportation infrastructure. The framework would allow determination of load and resistance factors that would, accounting for uncertainties in earthquake occurrence and effects, produce designs with reliabilities consistent with those achieved by LRFD procedures for high-probability (e.g. gravity) loading conditions. The uncertainties would be broken into aleatory uncertainties (i.e. randomness, which cannot be reduced with additional information) and epistemic uncertainties (i.e. those that can be reduced with additional information or knowledge) so that both load and resistance factors could account for varying levels of available information (e.g. on seismicity and/or local site conditions). Future project phases would be used to apply this framework to specific

seismic design problems, such as bridge foundation design, wall design, etc., with and without liquefaction.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: $100,000 for Phase I

Research Period: 12 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

Biases and uncertainties in geotechnical seismic analysis and design procedures are known to exist and to be significant, but they are not accounted for in a coherent, consistent manner in practice. As a result, the designs of structures and constructed facilities in seismically active areas frequently have different actual probabilities of acceptable performance. This situation results in the inefficient use of available design and construction funds, and of unintentionally different levels of safety for the public.

The payoff for the proposed research would come from the efficiencies of more consistent and uniform designs. Development of reliability-based design procedures will allow seismic aspects of design to be consistent with non-seismic aspects, and will allow the reliability of geotechnical elements to be balanced with the reliability of structural elements. They will also allow uniformity across geographic regions – structures in all of the various seismic environments of Washington (which vary dramatically in earthquake characteristics) would be designed for consistent reliability; recent evidence indicates that current procedures do not achieve consistent reliability.

Engineers are familiar with LRFD concepts for non-seismic design of foundations and other geotechnical elements of transportation facilities. The expression of the complex and uncertain characteristics of seismicity and seismic response in the form of load and resistance factors will allow rapid implementation of the results of the proposed research.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

Steve Kramer, University of Washington, 206/685-2642

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST

RECOMMENDED TECHNICAL MONITOR

Tony Allen, State Geotechnical Engineer, 360/709-5450

DATE

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National ____ Regional or Multi-state ____ Washington Only

PROBLEM TITLE:

Concrete Performance using low Degradation Rock

RESEARCH PROBLEM STATEMENT:

Aggregate degradation of marine basalt materials, particularly Eocene Basalts, has been a recognized problem in the State of Washington since a published report by Carl Minor in 1959. As the low degradation materials are removed from the source and subjected to water the interstitial basaltic glass that was created during formation becomes altered to a magnesium saturated montmorillonite clay. Generally as the low degradation materials are removed from a quarry they are typically very hard with low LA wear values. Specifications requirements for degradation of aggregates have been established for HMA and most aggregate products listed in WSDOT standard specifications. Degradation specifications were not established for concrete aggregate, however, it is believed that aggregate will see similar long term deterioration in concrete as we have seen in HMA or aggregate products which will result in early deterioration of the concrete.

RESEARCH OBJECTIVE:

Based on a thorough literature review, and taking into account the concerns of industry and concerns of WSDOT, establish discussion on the potential for long term deterioration of low degradation aggregates use in concrete and establish a long term evaluation program to study the effect of low degradation aggregate relating to the detrimental effect on concrete.

Work Plan: This work would consist of:

1. A report of thorough literature review and discussion of the potential for long term deterioration of concrete when using low degradation aggregate.
2. A well thought out plan to evaluate the long term performance of concrete when using low degradation aggregate.
3. With the help of WSDOT Materials Lab manufacture the test specimens necessary to do the long term performance evaluations.
4. With the help of WSDOT Materials Lab do all of the preliminary testing necessary to establish the base line for a long term study.
5. Prepare an initial report of the background information and preliminary data to set the stage for further long term evaluation by WSDOT.
6. WSDOT will do the long term testing and prepare interim and final reports.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: $80,000
Research Period: 2 years for the initial study, 20 years for the long term study

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION:

Quality gravel aggregate sources in Washington State are being used up and quarry sources are being used more and more. Identifying the potential for long term problems with the use of low degradation aggregates in concrete could have a long term pay off.

PERSON(S) DEVELOPING THE PROBLEM: Construction Materials Engineer (Jim Walter)

SUGGESTED PROBLEM MONITOR: Structural Materials Testing Engineer (Don Brouillard)

DATE AND SUBMITTED BY: 9/12/06 Jim Walter

PROBLEM TITLE

Analyzing the characteristics of property values to improve Right of Way Acquisition Estimates

RESEARCH PROBLEM STATEMENT

WSDOT Real Estate Office continues to seek methods to improve cost estimates for Right of Way acquisition necessary for project delivery. An important component of land acquisition cost is how the DOT project will increase or decrease the value of the property in the highway corridor. Once WSDOT has committed to a ROW corridor, landowners have substantial opportunities to hold out for higher prices than they would reasonably expect in an otherwise competitive land market.

RESEARCH OBJECTIVE

Various methods have been used to estimate the effects of highways and other modes of transportation on real estate values. This research will conduct a statistical analysis on various characteristics of real estate property values. The results of this analysis will be helpful in developing more reliable real estate acquisition estimates for project budgets.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$ 50,000
Research Period:	12 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

The primary payoff for this research will be a greater understanding of the characteristics of influence on ROW acquisition costs. The statistical approach will help to quantify certain aspects so that better predictions can be made early in the project development process.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

Gerry Gallinger, Real Estate Services Manager

OTHER OFFICES LIKELY TO HAVE INTEREST

Programming (CEVP)
WSDOT Regions

RECOMMENDED PROBLEM MONITOR

Gerry Gallinger

DATE October 2, 2006

MULTIMODAL RAC

PROBLEM TITLE

HOV Action Plan, Phase One – A study to identify and evaluate improvements and policy modifications that improve HOV system performance, especially on I-5.

RESEARCH PROBLEM STATEMENT

Many freeway HOV segments in the Puget Sound region now fail to meet the adopted speed and reliability standard. The result is decreased person throughput, reduced transit efficiency, and diminished incentives to commute via HOV modes. WSDOT needs to develop a plan that responds to these growing problems by identifying near-term actions for improving HOV system performance.

RESEARCH OBJECTIVE

Develop an action plan that identifies near term improvements and potential operating policy modifications. The objective of the study is findings that show what can be done to improve speed, reliability and person throughput of HOV lanes. Study elements would include:

a) Identify and analyze I-5 HOV segments failing to meet performance standards (where is the system failing and why? This can make use of the recently developed I-5 simulation model).
b) Model future HOV system performance to identify how planned and programmed projects will change HOV system speed, reliability and person throughput (what HOV improvements are already in the works and what will they accomplish?)
c) Identify and evaluate potential physical modifications that would improve I-5 HOV performance.
d) Analyze HOV operating policy options to determine how they would influence HOV performance.
e) Review proposed I-5 HOV projects to determine if they remain beneficial.
f) Evaluate the existing HOV performance standard to determine if it approximates optimal performance and ascertain whether policy modifications would be beneficial.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$190,000	estimated amount of funding
Research Period:	7 months	estimated length of time

If there are unspent T2 funds available in the spring of 2007 it is probable they could be applied to this project, which would enable work to begin prior to July. TRAC has indicated the research can be competed prior to year end 2007. This will allow WSDOT to prepare requests for legislative action in the 2008 session if appropriate. If funding is secured for additional phases that work would presumably extend into 2008.

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

Urgency – More than half of the freeway HOV lane segments now fail to meet WSDOT's adopted performance standard. In the peak direction most of the HOV segments now fail to achieve 45 mph 90% of the time during the peak hour. Increasing HOV traffic volumes and frequent congestion suggests that further

erosion of HOV system performance can be expected if prompt action is not taken. WSDOT is currently building additional segments of the Core Freeway HOV system, as well as planning new freeway facilities that are likely to include HOV elements. This presents an opportunity to ensure those additions to the HOV system are designed to standards that optimize performance. Addressing HOV system speed and reliability issues is especially urgent since transit agencies are expressing concern about diminished HOV lane performance, and WSDOT has to make HOV operating policy assumptions in corridor plans and studies.

Payoff - This study has potential to improve HOV system performance, which has a payoff in terms of both system efficiency and public support. The results can also help inform WSDOT plans and studies that require making assumptions regarding HOV operating policy. It is possible that results of the study can be used in ways that minimize the need for costly future modifications to projects that are now in the planning stage.

Implementation – Results will be applied in the near term to improve the I-5 HOV lane performance. Results will also be used to modify HOV facility design standards, and possibly adjust HOV operating policies. This study will complement work being done for the SR 167 HOT project and other corridor planning work.

A number of regions around the country are running into the problem of how to maintain HOV lane speed and reliability in the face of growing HOV traffic volume. This study will not only provide site specific answers for I-5, it will also help address the bigger question of how to determine when it makes sense to increase the HOV occupancy requirement or make other HOV operating policy adjustments.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

Charles Prestrud
WSDOT - UPO
prestrc@wsdot.wa.gov
206 464-1271

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST

NW Region Traffic Office
Headquarters Traffic Office
UPO/UCO Corridor Planning and Project offices, including the Tolling Organization
Headquarters SP&P
PT&R
Research Office/TRAC
Design Office

RECOMMENDED TECHNICAL MONITOR

Charles Prestrud

DATE December 4, 2006

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National __X__ Regional or Multi-state ____ Washington Only

PROBLEM TITLE

Measuring the impact of employer-based transportation demand management (TDM) strategies on transportation system performance

RESEARCH PROBLEM STATEMENT

Why is this an issue for WSDOT? What is the problem?

WSDOT increasingly is interested in managing demand for vehicle trips as a way to mitigate congestion during construction, and as a way to improve overall performance of the highway system. This requires an ability to predict the magnitude and geographic distribution of changes in travel behavior likely to result from steps taken at specific locations to manage transportation demand. It also requires an ability to build on these predictions to estimate the effect that these changes would have on delay, speed, and travel time through specific corridors. Some estimation is possible via modeling, but this work has been done retrospectively (what happened) rather that predicatively (what if). Multimodal, operational, and construction mitigation planning all have tools to estimate the effects of various options for improving transportation system performance. TDM planning lacks such a tool, and therefore many do not consider it to provide the same level of benefit as other approaches.

RESEARCH OBJECTIVE

How is research anticipated to contribute to a solution?

The proposed research seeks to develop the ability to estimate what effect implementing a particular demand-management measure at specific locations will have on the number of commute vehicle trips along specific corridors. The proposed research will use program element and mode choice data collected by the CTR program; data on infrastructure for alternative modes collected by WSDOT and transit agencies; and Census data, to estimate changes in mode split and numbers of commute vehicle trips between residence and workplace. An interface to transportation system planning models (such as those used by RTPOs/MPOs) will allow estimation of what effect the changes in trips would have on delay, speed, and travel time through specific corridors.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$90,000	estimated amount of funding
Research Period:	18 months	estimated length of time

This assumes that the CTR program staff will devote 1.25 FTE of time; much of the requested funding will go to support development of alternative-mode data and cleaning of program-element data.

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

What do you hope to gain from the research? How do you expect the research will be used?

We expect to develop a model that we and others can use to describe a worksite, its commuters, and their commute options; change characteristics of the worksite or commute options; estimate changes in mode split and vehicle trips from different residential areas. We expect the model to be additive, meaning that we should be able to make these changes for a group of worksites in, say, a corridor, and estimate how the number of vehicle trips in the corridor would change if these changes occurred. We expect that this model will be developed in a way that it can be linked to an MPO/RTPO traffic assignment model to estimate changes along specific routes, and thus estimate effects of these changes on delay, travel time, and speed. We have requests for this

ability now from CTR program stakeholders, including Snohomish County and King County Metro. We expect this to increase under the redesigned CTR program. We know that the Office of Transit Mobility is trying to approximate the ability to make these estimates on a case-by-case basis.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

Ed Hillsman, hillsme@wsdot.wa.gov, 360-705-7887
Keith Cotton, cottonk@wsdot.wa.gov, 360-705-7910

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST

- Public Transportation and Rail Division
  (Public Transportation and Commute Options Office, Office of Transit Mobility)
- Engineering and Regional Operations Division
  (Maintenance and Operations Programs, Urban Corridors Office, Northwest Region, Environmental and Engineering Programs)
- Strategic Planning and Programming

RECOMMENDED TECHNICAL MONITOR

Ed Hillsman, hillsme@wsdot.wa.gov, 360-705-7887

LITERATURE SEARCH SUMMARY *Review publications through the Transportation Research Information Services (TRIS) at http://trisonline.bts.gov/sundev/search.cfm and Research in Progress (RIP) at http://rip.trb.org to see if there is related work or additional information to support the project. The WSDOT Library is available to assist in this review*

Several efforts have been made to estimate what effect a specific TDM element will have when implemented at a particular worksite. However, these are limited either by

- the availability and quality of data (the Washington CTR data are recognized as being uniquely detailed, and related efforts at CUTR in Florida use the CTR data to demonstrate their approaches);
- a focus on the destination as in the TEEM and the EPA Commute Benefits models (corridor-level analysis requires origin as well as destination information); or
- a focus on other regions (rightly or wrongly, stakeholders of the CTR program have expressed reservations about using data from other parts of the country to estimate effectiveness of TDM, when these areas do not have as rigorous procedures for measuring effectiveness as Washington state, and when they do not have as extensive experience with developing and using TDM infrastructure; acceptance of the method is important to its adoption and use).

We anticipate that the model will use results of the TELUMI project to derive some of its predictors.

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

_X__ National ____ Regional or Multi-state ____ Washington Only

The project has national implications but, given the heavy reliance on Washington-specific data, it may find use only in Washington state.

PROBLEM TITLE

Building a Resilient Freight System in the Washington Transportation Plan - Phase 'Assess Probability of Disruptions Within Washington State's Freight System and Analyze Transportation Impacts of Potential Disruptions'

RESEARCH PROBLEM STATEMENT

Professor Yossi Sheffi, director of MIT's Center for Transportation and Logistics recently authored "The Resilient Enterprise", a study of how organizations develop and maintain competitive advantage when faced with disruptions in their supply chains. (For more information please see Dr. Sheffi's bio at http://web.mit.edu/sheffi/www/ and at http://brightsightgroup.com/speakers/speaker_145.html)

This topic is central to key issues in freight transportation, system operations, economic development and security that are being addressed by state DOTs around the country as we struggle to identify the critical factors that face our freight industries. In the face of much uncertainty including natural disasters, weather, terrorist acts, work stoppages, and other potential transportation disruptions, we need to work with freight partners to plan a transportation system that can recover quickly and prevent long disruptions to state and regional economies. Using the framework contained in Dr. Sheffi's research, WSDOT is posing the following research questions:

- How should the state/the region/companies define and prioritize threats?
- What are the common characteristics of all high-impact disruptions?
- Can the state/the region/companies prepare without knowing the type of disruptions they may face?
- How should the state/the region/companies maintain lean operations, which aim to reduce redundancy, without increasing vulnerability?
- Are intentional disruptions fundamentally different from accidents and random phenomena?
- How can disruptions be detected when so many simultaneous events are taking place in the normal course of commerce?
- How can the state/the region/companies build in flexibility so that it can be resilient?
- Should companies always prefer multiple suppliers to single-sourcing, and what are the transportation impacts of these decisions?
- What is the role of corporate culture in resilience?
- How can security investments support the main mission of the enterprise? Can they be cost-justified?

Phase 1 "Development and Design of Conceptual Approach" of this research is currently funded in the Freight Strategy and Policy office and will be completed in 2007. Phase 1 includes developing a thorough understanding of the existing work in the area of freight system resiliency in order to develop a framework for analysis of the resiliency of the state transportation system. In Phase 1 we will also identify potential threats and impacts to both the infrastructure and operational characteristics of the transportation system, as well as seek to understand current supply chains and the response of freight operators in the state to transportation disruptions. The primary Phase 1 deliverable is a framework for analysis of the resiliency of Washington's transportation system.

The WSDOT Research Problem Statement for the 2007-09 Biennium Selection is focused on Phase 2 of WSDOT's Freight Resiliency System research plan.
The Phase 2 problem statement is to 'Assess Probability of Disruptions Within Washington State's Freight System and Analyze Transportation Impacts of Potential Disruptions.' The goal of this task is to estimate the impacts of disruptive events on the ability of the state to move goods. The economic impacts will be evaluated in Phase 3, but in this task the transportation impact will be evaluated.

RESEARCH OBJECTIVE
Phase 2: 'Assess Probability of Disruptions Within Washington State's Freight System and Analyze Transportation Impacts of Potential Disruptions' includes the following tasks:

- From the list of threats and their potential impacts developed in Phase 1, identify a set of threats or categories of threats to be analyzed.
- For each threat to be analyzed, assess the likelihood of each event occurring within certain time horizons.
- With the threats and their probabilities, use the framework developed in Phase 1 to analyze the resiliency of the Washington transportation system. This will include:
    - Identifying the most valuable and least valuable components, both infrastructure and operational characteristics, of the transportation system with respect to moving freight,
    - Identify the most likely events and the impact of those events, and
    - Develop strategies for making WSDOT investments that would support improvements in the resiliency of the transportation system.

The deliverables from this task will be an understanding of the resiliency of the state transportation system and a report documenting this body of knowledge. It may include the following:

- Identification of the most likely events
- Identification of the weak points in the transportation system (transportation nodes or links or operational choices that will most impede goods movement in the face of transportation system failure)
- Identification of improvements that will have the largest benefits in terms of the state's ability to move freight when faced with a transportation system failure
- Identification of the most likely failures
- Identification of the most important elements of the transportation system in terms of the state's ability to move goods
- Suggestions for how WSDOT investments can best improve the resiliency of the transportation system.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$120,000
Research Period:	24 months

Anne Goodchild (UW) and Ken Casavant/Eric Jessup (WSU) will also be submitting a joint request for $80,000 from TransNow in the spring using these dollars as match.

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
The Washington State Department of Transportation is pursuing a research program to help it understand how building a resilient system can be incorporated into the freight

element of the state transportation plan and develop a conceptual approach that bridges the important and emerging interest in freight transportation, transportation system operations, economic development and security.

The sense of urgency is high, as daily disruptions occur in the freight system and high-impact disruptions could happen at anytime. There is no current regional or statewide plan to create a resilient freight system in Washington State.

Phase 1 of the research will provide a framework for WSDOT to incorporate the resilience concepts into their planning, and be completed in 2007.

Phase 2, the focus of this proposal, will make use of the resilience planning framework
developed in Phase 1 to analyze the probability of freight system disruptions and their transportation impacts.

When Phase 2 is completed, the WSDOT Freight Strategy and Policy office plans to pursue implementation of Phase 3 objectives: 'Economic Evaluation of Different Freight
System Impacts (Budget: $200,000). Phase 3 of this research will develop an estimate
of the economic impacts of the threats identified in Phase 2.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Barbara Ivanov
Director, Office of Freight Strategy & Policy
Washington State Dept. of Transportation
PO Box 47322, Olympia, WA 98504-7322
360-705-7931
ivanovb@wsdot.wa.gov

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
John Himmel, WSDOT Emergency Operations Manager
Brian Smith, WSDOT Strategic Planning and Programming
Chris Christopher and Ted Trepanier, WSDOT Maintenance and Operations

RECOMMENDED TECHNICAL MONITOR
Barbara Ivanov

LITERATURE SEARCH SUMMARY Review publications through the Transportation Research Information Services (TRIS) at http://trisonline.bts.gov/sundev/search.cfm and Research in Progress (RIP) at http://rip.trb.org to see if there is related work or additional information to support the project. The WSDOT Library is available to assist in this review

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National __X__ Regional or Multi-state __X__ Washington Only

Please note that PSRC Planning Director Charlie Howard reports that a NCHRP committee is recommending $75,000 to fund a national research project that PSRC and WSDOT co-submitted on providing a framework for incorporating resiliency (ala Sheffi) into transportation planning. This research, if approved this fall at AASHTO, will begin in January 2007.

Funding Partners:
To fund the proposed research we will pursue funding opportunities with more than one agency. Currently identified partners include the following:
State departments of transportation: States such as Oregon may be interested in the results if a general process can be developed for resiliency planning.
Puget Sound Regional Council (PSRC): This metropolitan planning organization has a regional travel demand model that could be used to test scenarios. Given its responsibility for regional disaster planning, the PSRC has an interest in understanding the resiliency of the Puget Sound's transportation system.
National Cooperative Highway Research Program (NCHRP): A research proposal for $100,000, "Adding Resilience to the Freight System in Statewide and Metropolitan Transportation Plans: Developing a Conceptual Approach," was submitted to the NCHRP in August 2006. This funding could be used to support Phase 1 research.
TransNow: The Region 10 University Transportation Center has an interest in supporting research that will improve the resiliency of the state's freight transportation system. Funds from TransNow must be matched by non-federal transportation funds.
Washington State Department of Transportation (WSDOT): The WSDOT Research Office and other offices within WSDOT are interested in improving the resiliency of the state's freight transportation system.

Future Research
The WSDOT is interested in a research program to help it understand the resilience of the current freight transportation system and how it can be improved. In addition to the tasks outlined above, there are technology, communication, and institutional issues that affect to the state's ability to respond to transportation system failures. Described below are several research topics that could be pursued in addition to those identified above.

Technological Development and Adoption/Implementation: Academic researchers would inventory (by use, applicability, cost, speed of information, audience) the different types of technology necessary or desirable in the event of a major freight system impact. This would include a comprehensive description of current and emerging technologies and the tasks (challenges) that would be involved in implementing different technological systems across multiple state/local agencies and private sector businesses.

Communication Plan Across Federal/State/Local Organizations and the Freight Community: Academic researchers would develop a detailed description of how the information/plan would be disseminated across many varied organizations with multiple jurisdictional responsibilities.

Institutional Issues: The state's ability to respond to transportation system failures depends on the level of planning undertaken prior to the event, including identifying protocols and establishing contracts for services. This research would review the protocols and contracts established by regions that have excelled at such an effort and would develop recommendations for changes to existing planning in Washington state.

INFORMATION & FINANCE RAC

PROBLEM TITLE

Development of Consistent and Reliable StatewideTraffic Data Analysis Tools Based on Customers Needs and Expectations

RESEARCH PROBLEM STATEMENT

This research targets improvements to data, data collection, and data management that will make WSDOT traffic data across the state better and more consistent. There are thousands of loop data sights in Washington State that are used for operations but not used for planning purposes because the accuracy does not meet the needed threshold. It is essential to improve loop data accuracy to make better use of existing loop detectors. Better data collection will improve operations and performance measurement. Being able to use all data stations will provide a wealth of information for better planning, project scoping, and it will also prevent the need for duplicate equipment, construction, and maintenance.

RESEARCH OBJECTIVE

The research team will hold a WSDOT data conference in which data providers and data users will come together and align goals, expectations and needs. The needs of each user will be matched to data availability and accuracy and data sets will be determined. One longtime undecided question is what data tool will provide the best service to data users? This research will answer whether WSDOT should move forward statewide with PEMs, CDR, TDAD or some other available tool.

This project will develop an online analysis tool for identifying the operational state of data stations and potential uses of data collected by the stations. Currently, it is difficult to determine if the source data is “bad.” In fact, we have no commonly accepted definition of “bad” because it varies from user to user and because of the lack of ground-truth data at detector locations. This project will develop a method for loop data quality control and create a consistent or “platinum” data set based on customers’ requirements. Online ramp balancing will be used in this tool. The online ramp balancing will occur by first identifying good data stations and then balance all the stations off the good data stations.” Error propagation analysis may be used.

After this assessment and analysis an implementation process will be defined. This process will identify what WSDOT resources are needed to maintain and support collecting better data and providing consistent use of the data. It will determine the best method to detect loop malfunctions determine loop accuracy and notify of loops needing adjustment. This might include costs to have someone use the existing UW Advanced Loop Event Data Analyzer (ALEDA) system to calibrate loops or determine repairs. This will be presented to the research advisory committee and research executive committee. This effort will provide an easy method to prioritize repairs and maintenance of data stations.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Requested Funding: $100,000 (Operations RAC also funded at $100,000 for a total from WSDOT of $200,000; this $200,000 will be used a match to request another $133,000 from TransNow in the spring).

Research Period: 24 months

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

There are multiple projects with the possibility of early wins. Providing a consistent data set that works for all organizations across WSDOT will help ensure accurate performance measurement, better support for pavement management, more accurate operations, and provide a much bigger data set for everyone to use.

The project is urgent because TDO and Traffic are proposing construction of new data stations and these efforts need to be aligned. There is potential to align and prioritize maintenance activities to support all groups dealing with traffic data.

The intent will be to deploy any applications developed. During the data conference involved parties will be asked to provide a commitment to deployment for the products developed. The approach will be discussed and developed with those involved. The application(s) will be designed so there is minimal cost in deployment. This will result from building it stand alone, pulling data from existing collection systems or databases depending on the application, or by building it into an existing UW product like CDR or TDAD.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

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Daniela Bremmer bremmed@wsdot.wa.gov 360-705-7953

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST

Traffic Data Office
Office of Strategic Assessment
Traffic Office
Materials Lab Office

RECOMMENDED TECHNICAL MONITOR

Morgan Balogh

DATE

October 05, 2006

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National ____ Regional or Multi-state ____ Washington Only

PROBLEM TITLE – "Washington State Ferry (WSF) Passenger Demand and Lost Revenue Analysis"

RESEARCH PROBLEM STATEMENT
Given the current WSF fare collection design of collecting payment for westbound passengers departing from east Puget Sound terminals the potential exists for significant lost revenue (tariffs) when walk on passengers traveling from West Puget Sound to East Puget Sound find alternative transportation back to the West Puget Sound. The existing WSF payments are collected as follows:

- Walk on passengers pay a round trip toll at the Fauntleroy, Seattle, Edmonds terminals located on the east side of Puget Sound for ferry passage to Southworth, Bremerton, Bainbridge Island, and Kingston located on the west side of the Sound.

- Walk on passengers from the West Puget Sound terminals traveling to Seattle or other ports on the East side of the Puget Sound do not pay a toll. They therefore have an opportunity to ride a ferry to work, for example, and then take a transit bus or share a ride home from the east side of the Puget Sound without paying for ferry passage.

- Additionally, the upcoming Narrows Bridge toll collection will occur on the eastern side of the Sound. This location of toll collection supports the ability for no revenue collected by any WSDOT facility for passage on the Narrows Bridge or ferries for those passengers traveling via ferry in the morning and driving home at night.

RESEARCH OBJECTIVE: HOW IS RESEARCH ANTICIPATED TO CONTRIBUTE TO A SOLUTION?
WSU Faculty Researchers (Jessup and Yoder) will develop estimated passenger travel demand, by route and station that will allow evaluation of potential revenue loss due to the problem described above. This analysis will address the level of need for policy options to modify/improve collection efficiency in order to ensure all WSF service is provided to paying customers.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Requested Funding:	$80,000
Research Period:	10-12 months

PAYOFF POTENTIAL: WHAT DO YOU HOPE TO GAIN FROM THE RESEARCH – HOW DO YOU EXPECT RESEARCH TO BE USED?
The end result of this research will be significantly improved information regarding passenger travel demand behavior as it relates to utilization of Washington State Ferries. This will translate into improved management and operational efficiency of the Washington State Ferry system, leading to improved service. WSF is a steward of Washington State ferry revenue generated by ferry service. WSF intends to ensure all revenue due for service is paid and reported to legislature.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
Name, email address, and phone number.
Melissa Johnson

Johnson@wsdot.wa.gov
206-515-3426

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
Academic researchers interested in travel demand analysis and transportation policy makers concerned with maximizing both transportation service and operational efficiency. Also, other WSDOT planning agencies, especially those related to the operational success of the Tacoma Narrows Bridge.

RECOMMENDED TECHNICAL MONITOR

DATE

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

____ National ___ Regional or Multi-state __X_ Washington Only

PROBLEM TITLE
Pooled Fund Study to Determine the Feasibility of Creating a Vehicle Length Classification Scheme

RESEARCH PROBLEM STATEMENT
WSDOT created a vehicle classification scheme about 10 years ago that is based on vehicle length. The current scheme categorizes vehicles into 13 distinct classifications. We hope to have some part in the study so the traffic data that we have collected and reported on to date is approximately equal to the final classification scheme resulting from this study. We hope to create a classification scheme that will result in better traffic data.

RESEARCH OBJECTIVE
The new Mechanistic Empirical Pavement Design Guide (MEPDG) outlines different levels of traffic data input for its software. The lowest level of data is traffic volume. The next level is length based classification. The next level is axle based classification. The highest level is vehicle weight data. By developing an acceptable length classification scheme we will be able to supply that level of data even when an axle sensor becomes inoperable.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding:	$30,000-40,000 per state
Research Period:	TBD

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION
This research will be used to update our current length classification scheme. The current scheme was based on a study done by Barbara Hertzog and with vehicle characteristics changing over the last 10 years may need to be updated. The results of this study will be used to update our EPROM chips in the traffic counters we use and will result in a nationally approved length based classification schematic.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT
John Rosen, WSDOT Transportation Data Office, rosenj@wsdot.wa.gov (360) 570-2373

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST
Traffic Office, both Headquarters and Regional. Materials Lab.

RECOMMENDED TECHNICAL MONITOR

DATE September 8, 2006

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National ____ Regional or Multi-state ____

Washington Only

PROBLEM TITLE

Data Integration and Document Management Using Ontologies

RESEARCH PROBLEM STATEMENT

There is still a problem of disconnectedness among various transportation information systems (CAD, CADD, GIS, Design, Accident, Planning, etc.). Assembling data from disparate systems for practical applications (document management or knowledge discovery, for example) is still a laborious process. What causes this inability to share information among systems? Are current tools of system integration succeeding? Efficient and error-free system interoperability still has not yet been achieved at WDSOT. Perhaps we need to look elsewhere or at some deeper issues that are not strictly technically-focused.

For the knowledge we store about real world features (roads, bridges, wetlands, traffic, etc.) in our data sets, there are multiple and competing concepts, semantics and levels of granularity ("fineness", or "coarseness" of the data, not just scale) at work. Seemingly simple concepts such as "lane", "route", "road", and "centerline" for example, have numerous meanings throughout the business areas within WSDOT. We cannot yet efficiently connect, aggregate, and assemble documents and data because of these conflicting meanings and information granularities across the business domains without causing error or other problems. The ability to assemble and use disparate datasets and documents remains cumbersome.

Ontology is the formal structuring (in a software environment) of concepts held by a business area. They are domain-specific knowledge representations. There has been recent work involving notions associated with ontology in philosophical and IT research that perhaps can be applied to transportation data integration and document management problems. These tools could be implemented and utilized to resolve some of the terminology and conceptual incompatibilities. Can ontology be used to as a means to improve access to, understanding of, and management of disparate data stored in multiple systems throughout the transportation business areas?

RESEARCH OBJECTIVE

The overall objective of this research would be to determine if ontologies can be used to solve some of the problems associated with information integration, document management, and knowledge discovery within WSDOT. It is proposed that the research scope include at least three areas of focus:

First, researchers will canvass other state DOT to determine what attempts have been made to improve data integration and document management. These activities would include reporting on new data models, standards, data catalogs, enterprise data sets, data marts, lexicons, taxonomies, protocols, web portals, and so forth. The research will document those practices that have been successful, or identify shortcomings in these attempts. Researchers will review efforts in other disciplines (medical, law, environment, biology) where ontologies are used to enhance and streamline data integration efforts or where ontologies are used for to help solve the problem of document management.

Secondly, researchers will build a pilot ontology that captures domain-specific knowledge about real world features (roads, bridges, utilities, etc.) in at least two business areas. Researchers will determine how these features are depicted on/in documents such as database tables, maps, reports, or drawings. The intent is to

formalize concepts of transportation features held by separate domains to determine where there is agreement or mismatch between each domain's views of the real world.

Thirdly, researchers will use the results from building the pilot ontology to design and construct a web-based system (a prototype) to assist users in the tasks of data integration, document management, and knowledge discovery. The intent would be to show the viability of using ontologies as an underpinning to for building specific system applications.

ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

Requested Funding:	$110,000	estimated amount of funding
Research Period:	12 months	estimated length of time

URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION

Because of the conceptual differences business area have of real-world features and how these features are articulated in documents, data integration and document management remains an arduous task. If the use of ontology is shown to be effective, it could indicate justification for transportation agencies (WSDOT) to consider this technique as a tool to enhance data integration and document management strategies, particularly when designing and implementing web-base information portals.

PERSON(S) DEVELOPING THE PROBLEM STATEMENT

Ron Cihon
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360-709-5510

OTHER OFFICES WITHIN WSDOT LIKELY TO HAVE INTEREST

Office of Information Technology
Computer Aided Engineering
Right of Way and Real Estate
Planning

RECOMMENDED TECHNICAL MONITOR

Ron Cihon
Manager, Cartography and GIS
Geographic Services

Gordon Kennedy
Manager, Data modeling
OIT

DATE

Proposal prepared on October 5, 2006.

DOES THE PROJECT HAVE NATIONAL, REGIONAL/MULTI-STATE OR WASHINGTON ONLY IMPLICATIONS?

__X__ National ____ Regional or Multi-state ____ Washington Only

Problem Title
I & F RAC Quick Response Fund

Problem Statement
The issues addressed by the Information and Finance Advisory Committee frequently require new information, assessment, methods and or technical tools. Often these improvements are required in a relatively short time. The I&F RAC proposes to address these emergent needs by setting aside a portion of their research allocation for a quick response research budget.

Objective
The objective of this project is to establish a flexible program of quick-response research designed to develop improvements to the analytical methods, decision-support tools, procedures, and techniques employed by practitioners to support the issues addressed by the I&F RAC.

Issues addressed by the I&F RAC

- Data
- Collection
- Management
- Funding
- Information Technology
- Performance Measures
- Programming
- Workforce Management
- Access Management

Process
Decisions on funding will be made by the I&F RAC Chair, the manager responsible for the issue within the agency, and the Director of the Office of Research and Library Services.

Budget
$20,000

Technical Monitor
Brian Smith

Problem Title
I & F RAC Contingency Fund

Problem Statement
The research issues addressed by the Information and Finance Advisory Committee frequently require new information, assessment, methods and or technical tools. Often these research projects given changes in technology, financing tools and policy changes may need additional resources. The I&F RAC proposes to address these emergent needs by setting aside a portion of their research allocation in a contingency fund research budget.

Objective
The objective of this project is to establish a flexible contingency fund for current research designed to develop improvements to the analytical methods, decision-support tools, procedures, and techniques employed by practitioners to support current and emerging research issues addressed by the I&F RAC.

Issues addressed by the I&F RAC

- Data
- Collection
- Management
- Funding
- Information Technology
- Performance Measures
- Programming
- Workforce Management
- Access Management

Process
Decisions on contingency funding will be made by the I&F RAC Chair, the manager responsible for the issue within the agency, and the Director of the Office of Research and Library Services.

Budget
$22,000

Technical Monitor
Brian Smith