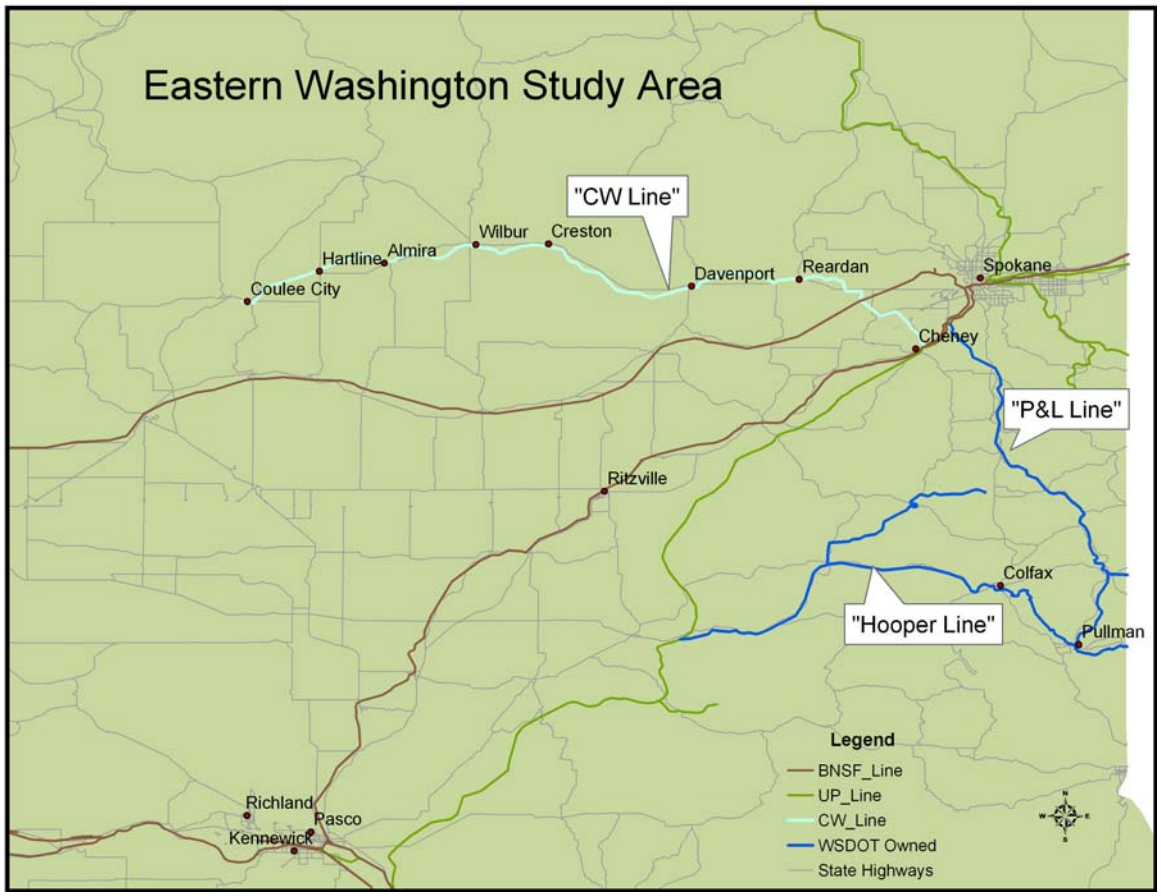
Palouse River and Coulee City Railroad: CW Line Market Assessment



Report to the Washington State Department of Transportation

Palouse River and Coulee City Railroad: CW Line Market Assessment

Prepared for the

Washington State Department of Transportation
Office of Freight Strategy and Policy

By

Ken Casavant and Eric Jessup

March 2006

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

FIGURES

TABLES

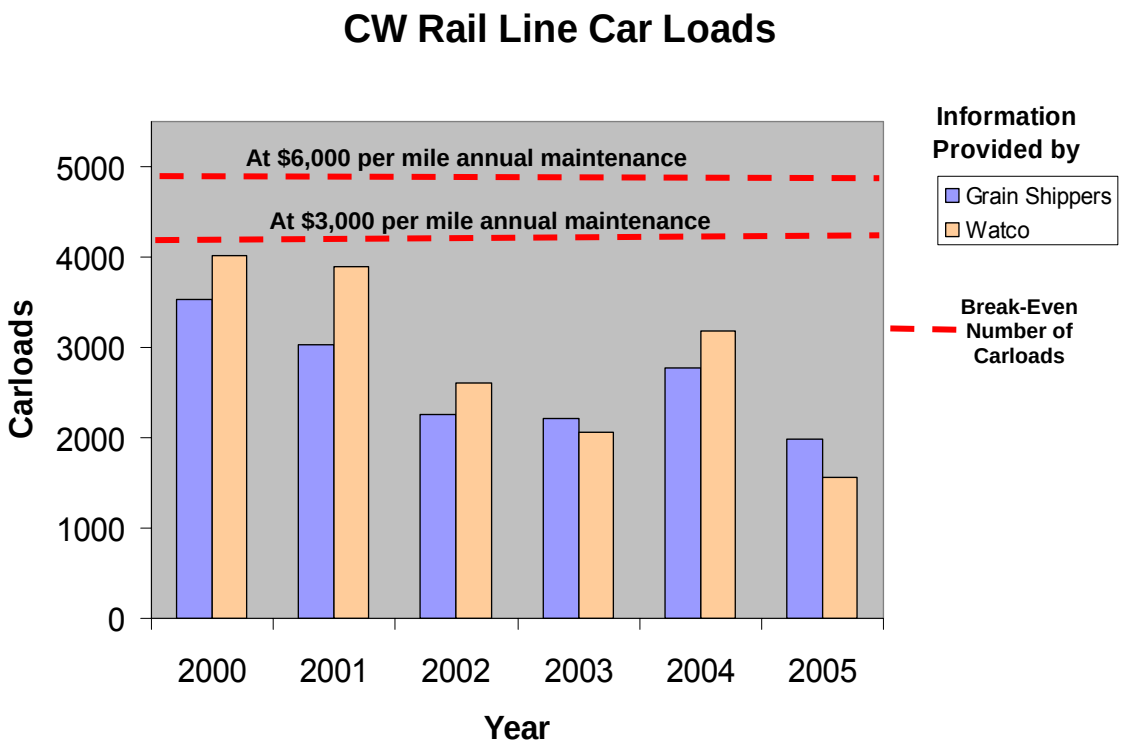
ACKNOWLEDGEMENTS

Selected material for this report was obtained from information collected and gathered by the Strategic Freight Transportation Analysis (SFTA) research and implementation project, conducted under a grant from the Washington State Department of Transportation. Also, the grain co-ops served by the CW rail line were very helpful providing historical shipping volumes and explaining the market dynamics. Dr. Denver Tolliver of the Upper Great Plains Transportation Institute and Tom McLaughlin of Tyee Partners, Inc. also provided valuable input. Any errors, though, remain the responsibility of the authors.

EXECUTIVE SUMMARY

This CW line market assessment has revealed a dynamic and uncertain market with a multitude of competing forces and decision makers/stakeholders in the market having different options. Among other issues that are certainly not known for sure, but may be critical, are the level of maintenance chosen for the line, the timing and magnitude of the track rehabilitation, the level of grain traffic committed and achieved on the line, the amount of new "economic development" traffic reached (Geiger spur, Rabanco, bio-diesel, strawboard plants, forest products, etc.), the continued progressive marketing by the Ritzville facility management, energy impacts on operating costs of all modes, etc. These forces make this marketing assessment and accompanying viability evaluation and any resultant investment recommendations also uncertain and susceptible to the business decisions by firms and institutions in the market. The lack of certainty makes consultant evaluations and state policy recommendations necessary but vulnerable.

The basic issue is identified in the figure below. The volume of carloads on the CW line has consistently been below that needed to cover all costs of operation, at various levels of maintenance. In the earlier years the shortfall was covered by Watco's deferring maintenance on the line; in the recent years the shortfall has increased to where operating costs may not even be covered and the railroad has considered abandoning the line. That situation led to this market assessment for the Washington State Department of Transportation where costs, revenues and sustainability under varying conditions were examined. Data provided by Watco, surveys and interviews with shippers, and accompanying analyses by Dr. Denver Tolliver and Tyee Partnerships, Inc. were used in the assessment.



Market Assessment Findings

The authors find the **Most Probable Scenario** in the future to be the following. The CW line is marginally profitable or unprofitable depending on shifting market conditions and shipper commitment. If high maintenance investments per mile are necessary to operate at the cost efficient 25 mph, and shipper commitment to the line is low or remains at recent levels, and existing carrier costs (irrespective of who the carrier is) are incurred, a shortfall loss will occur and continued ownership (State, port, or whomever) will require an annual operating cost investment (subsidy). This investment would probably be around $200,000-$400,000 if high maintenance is required and zero to $100,000 if only medium levels of maintenance are necessary.

The **Best Possible Scenario** would occur when grain volumes increase over 3,000 cars as a result of renewed shipper commitment to the CW line (due to Scoot train efficiencies, desire to maintain competitive transportation market, search for marketing flexibility, new firms and traffic), while maintenance is only required at the medium level (still twice the current levels) and operating costs are decreased (due to new ownership/operating management, increased volume, earlier rehabilitation investment, state Grain Train cars, etc.) Under this scenario, revenues will cover both fixed and operating costs, including any return on investment desired by the operators or owners. No additional annual investment (subsidy) would be required by the state.

The **Worst Possible Scenario** would arise when increasing traffic volumes fail to materialize (for whatever reason), no new "economic development" traffic is realized, a high maintenance level is required (for whatever reason), increase in carrier costs per car caused by low traffic levels occur, a new 110 car load facility is built in competition with CW line movements, and BNSF rate differentials make the Ritzville facility even more attractive. In this case annual investments (subsidy), if the line is to be kept operational, might be as high as $1,000,000 per year.

Public and Private Benefits, both quantifiable and potential, to consider in this decision are substantial. No benefit/cost analysis was requested for this study but a positive benefit/cost ratio is probable. Road damage and usage costs avoided by maintaining the CW line are estimated to be from $3.4 million to $11.5 million for state highways every 15-20 years. For the same period of time county roads, because of their lower level of construction, and the routes chosen by the trucks, are estimated to incur road expenditures of $21.7 million to over $50 million, from traffic related to the CW line. The range of total highway impacts from CW line abandonment is between $25.7 million and

over $51.4 million, (or more, if extra reconstruction on certain county roads is necessary) identifying a significant benefit to the state and counties from maintaining the CW line.

Other Benefits Exist that are associated with having the competitive and complementary functions of the CW line, benefits such as the lower costs rates to shippers as competition drives prices down to long term variable costs, improving efficiency in the overall system. The CW line also offers shippers flexibility in marketing their products, increasing the modes, routes and marketing/storage alternatives, including using the secondary freight market to guarantee car availability or revenue enhancement in an up market. The current shippers believe that rate increases by truck-barge or truck-Ritzville are and would be constrained by the continued availability of the CW line.

Energy consumption and emissions production would be increased if the line is no longer available. The energy efficiency of rail is 30% higher than barge and about 100% better than truck. Emissions production follows proportionately the increased level of energy (fuel) used in transporting the products out of and into the region.

Implementation

Actual Operating Costs for the existing or future railroad operations must be accurately determined. Tyee's analysis and comments reveals the uncertainty felt by the analyst, and agreed to by these authors, on the completeness and accuracy of the original and revised costs and traffic levels offered by Watco. Negotiations with the current or new operator require increased transparency of financial information above that currently

available. Alternative and potential rail managers/firms can aid in discovery of that operational information.

Actual Maintenance and Marketing Efforts are critical to the long term viability of the CW line. Any purchase or operating agreement should include specific detail on responsibilities, auditing and enforcement of the maintenance commitments as well as traffic and cost experiences; otherwise the value of the State's investment deteriorates and the viability of the line is threatened. The marketing effort should also be specified in detail in any contract, marketing effort that indicates a reaching out for both past traffic and new potential traffic, both agricultural and "economic development". Grain shippers should be aided in seeing the potential tradeoff between short term "cents" versus long term "dollars" if the CW line is eliminated.

Federal/Regional Partnerships may be possible in supporting the continued operation of the CW line. The security and electrical power benefits identified as possible during the short time of this study suggest that this line reasonably might be a candidate for Federal/Regional partnership with the State.

BNSF's Approach to rates and railcar availability in the region may be the overriding ultimate market force. For that reason, the State is encouraged to negotiate all relevant projects throughout the state as a package of public/private partnerships, rather than looking at this short line and region as a separate and isolated case. The outcome of those state wide deliberations affects the dynamics and future of the entire state and regional market.

INTRODUCTION AND BACKGROUND

Railroad transportation serves an integral role in the movement of Washington products to distant markets. In fact, without the development of the railroads, especially in eastern Washington, the level of development in agriculture, forestry and mining seen today would simply not have occurred. Access to markets, domestic and international, has made it profitable and productive to live and to farm, harvest and mine in the areas far from those consumer markets.

Eastern Washington has been blessed with the existence of a complete transportation system with the availability of all freight transportation modes; truck, rail and barge. The advent of barge transportation, with the opening of Lower Granite Dam in 1975, provided a complementary and competitive role that has been played by waterway transportation. Truck and barge work so closely together in moving products to markets that they are often referred to as one mode, "truck-barge". Past work by the authors of this report show that, in 1994, slightly over 61% of the grains moving out of eastern Washington went by barge; in 2002, that barge share was still at 60%, but interestingly, slightly over 5% was by the combination of rail and barge. In the earlier period the entire movement had been brought to the barge by truck. Hence, this complementary role between barge and the other facilities is pronounced and productive for the region.

But, the barge system also served an effective competitive role in the region, causing railroad rates to be held at stable levels. In fact, a past review of rates by these authors indicates that, as late as 1999, railroad rates were at the 1936 level. This is not because of the benevolence of the large railroads, but it is because of the competitive role served by the presence of barge transportation and the changing technologies used by the railroads.

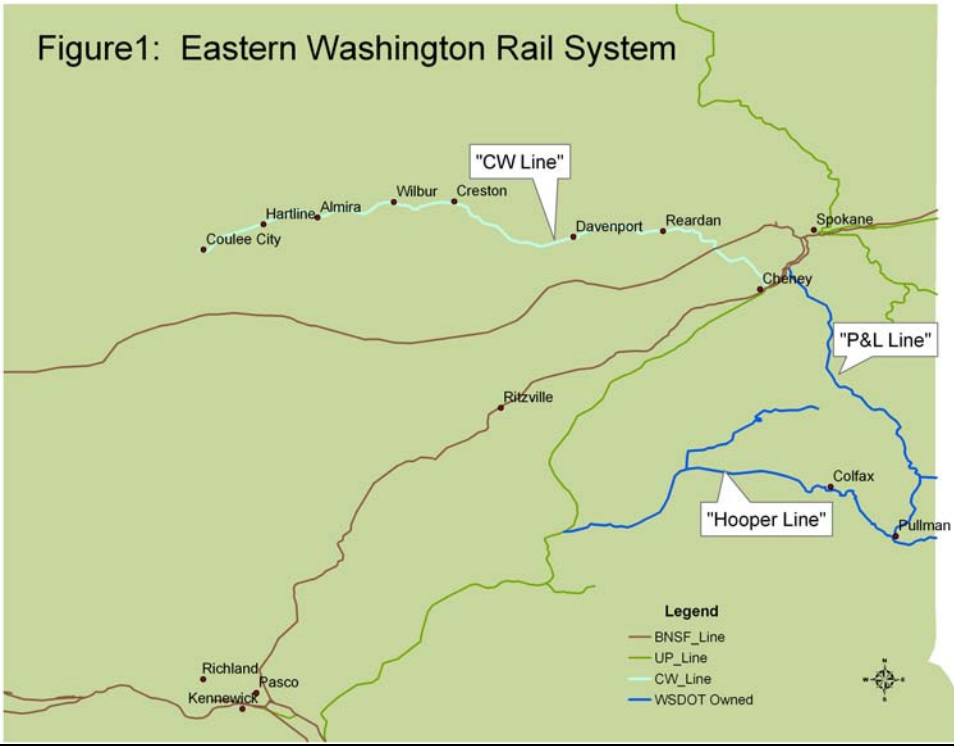
Competition from the truck-barge mode, then, was very instrumental in holding railroad rates very close to costs of operation on the Class I railroads (BNSF and UP), as evidenced by revenue to fully allocated costs in the 80% range. But, these low rates, combined with the low returns being experienced by railroads nationally, and the Staggers Rail Act of 1980 which gave increased flexibility to railroads to abandon or sell off unprofitable lines, lead to massive abandonment of rail lines in the 80's and 90's. In Washington State over one-third of the lines were abandoned during that period. Because of the low revenue being earned on these lines, most of these lines had not been regularly maintained at the desired level and, as a result, were not in very good physical condition at the time of abandonment or sale.

In lieu of total abandonment and pulling up the tracks, the formation of short-line or regional railroads became common. Such short line railroads were less fettered with labor restrictions, more market oriented and less wage driven, allowing many to succeed where the Class I's were failing. In Eastern Washington two lines were formed, the Palouse River Railroad and the Blue Mountain Railroad; in 1996 these two lines were formally purchased from the BNSF and combined into the Palouse River and Coulee City Railroad (PCC). These are the subject lines for the Phase I and Phase II reports from this marketing assessment.

The success of short line railroads throughout the nation has varied. Many railroads, initially purchased by "rail buffs", lacked the managerial expertise and the marketing knowledge to survive in the long run. Others, especially railroads dependent on bulk agricultural movements, found the revenue too low to sustain operations. These concerns are being expressed here in eastern Washington where Watco has publicly and privately stated that several of these lines generate such a low level of traffic and

revenue that only branch operating costs are barely covered, if at all, with the returns not covering annual debt service, rehabilitation needs or return on equity for the railroad entity. The PCC, through its corporate owner, Watco Companies, Inc from Pittsburgh, Kansas, is now considering abandoning the CW line rather than selling the line to the State of Washington, as had been earlier decided. As will be reviewed below, the condition of the P & L line has generated other questions, as well as the extent of rehabilitation to be done on each of the three lines, CW, P & L and the PV Hooper.

The potential of continued and expanded public ownership of some of the sections of this shortline railroad has raised questions of operations, rehabilitation, local control and interest, and required investments. Answering all of these questions is difficult due to the dynamic and changing marketing landscape in the region surrounding the branches as well as for the investment currently tied up in the lines. But the need for information and analysis to guide and shape public decisions on the appropriate role of the State in this situation is critical.



SCOPE AND OBJECTIVES

The Washington State Department of Transportation and Drs. Ken Casavant and Eric Jessup, through HDR Engineering, agreed on the following scope, objectives and tasks for this study.

Background

The Washington State Department of Transportation desires information on the historical, current and potential future of the market surrounding the Palouse and Coulee City Rail Lines. Changing market conditions, including but certainly not limited to a 110 car rail loading facility at Ritzville, are affecting traffic on these lines and the operating railroad has suggested abandonment might be necessary. This study is to provide that desired information in a timely manner, based on interviews and surveys of potentially involved or affected firms, and entities.

Objectives

1. Evaluate the current viability of the CW line on a private business basis and the changes that have created the current situation

2. Examine potential changes in the market and industry that will be affecting the traffic, revenue and the line's viability in the future.

3. Inventory public benefits associated with maintenance of the CW line.

4. Summarize and project the conditions affecting future economic viability of the CW rail line and the provision of public benefits.

Work Tasks

The following specific work tasks for this project are to be performed by the authors as parts of Phase I and Phase II:

Work Task 1: Interviews and Data Generation

Conduct a series of interviews to do a market study of the CW rail line. Information to be compiled in this study will be identified in consultation with the Freight Strategy and Policy office of the WSDOT. General information will be sought as to:

- Movement of grain shippers to the Ritzville shuttle train from the CW line in the past several years and the volume of shifted traffic that has occurred.
- Shippers that have remained on the CW line, their volume on the line and the desirability of the CW line from these shippers' perspectives, as well as those shippers that prefer to use truck-barge and the associated volumes.
- Other shippers, such as Coulee Dam electric entities and Geiger spur businesses that rely on the CW line and, if so, how much or how often and what are the alternatives for such movements.
- Shipper investments made relative to use of the CW line and, if so, what type and how much is the investment? Further investment needed if CW line is no longer available?
- Perspective of special interests (cities, counties, RTPOs, parks, federal interests, etc.) relative to maintaining the CW line.
- Impacts on roadway infrastructure for remaining shippers of loss of the CW line

Work Task 2: Analysis

Summarize and analyze the information, emphasizing evaluation of the economic feasibility of the CW shortline, the impact of losing the CW line and the manner that shippers and other stakeholders would react to such an occurrence.

Work Task 3: Reports

Write a draft report on findings of the market analysis and any recommendations by February 1, 2005 and a final report, after WSDOT review, by February 15, 2005.

Work Task 4: Customer survey

Initiate and conduct a complete customer survey in late January and early February for the three PCC lines; CW, P&L, and PV Hooper. A list of current, past and potential shippers will be compiled and a mail questionnaire will be distributed, using the Dillman Total Questionnaire Survey Method. Information will be classified as to in-state versus out-of-state, commodity, producers versus marketing managers. Other information will be sought, including the following:

- Volume of shipments, by loads/mode per week and by total shipments.
- Current transit time from PCC facility to final destination, and other modal alternatives and variance in that time to ascertain the quality of service characteristics by mode.
- Cost and availability of existing and alternative modes or means of shipment, in current dollars and on specific routing with as much specificity as possible on road miles and rail miles on each alternative.
- Business development plans or expectations, including bio-diesel plants and implications.
- Rational for current decisions as to modal choice, both quantitatively and qualitatively.
- Trend analysis of modal shifts in Washington's wheat supply chain between;
    - Shortline rail/barge
    - Truck/barge
    - Shortline rail to coastal ports from 1995-2005 and projected to 2015, along the three PCC branch lines.

Work Task 5: Summarize and Analysis

Summarize and analyze the data developed in the industry-wide survey emphasizing the future expected movement patterns and the impact of decreased or no service on the PCC.

Work Task 6: Preliminary and Final Report

Write a preliminary report by April 1, 2005 and a final report by April 15, 2005.

CURRENT SITUATION

WSDOT was preparing, in September, 2005, to undertake negotiations to finalize the purchase of the CW line (the monies were now available in this biennium and WSDOT doesn't purchase property until the funds are available), having completed all necessary and required title searches, but on September 13, 2005, Watco withdrew its earlier offer to sell the CW line to the State. Watco suggested that market conditions for the value of the line, and the changing market situation for traffic on the line, made it more profitable to abandon the line and sell the rails, ties and other materials for scrap value. On September 16, 2005 WSDOT informed the chairs of the Senate and House Transportation Committees, members in affected districts and community leaders with rail projects dependent for service on the CW line that Watco had stopped the sale of the CW line to the state. Watco then stopped service on the CW line in early October, 2005. Since future service on both the CW and the P & L lines was questionable at this time, WSDOT informed Watco and the legislature that they wouldn't make commitments for additional rail line purchase or rehabilitation until issues were clarified.

WSDOT has authority to spend $1.58 million of the PCC rehabilitation funds in the 2005-2007 biennia, with plans to spend most of those funds on the P & L line. WSDOT was considering Watco's request to shift some of those funds to the PV Hooper line, when Watco informed WSDOT it wanted to eliminate service on the P & L line. Watco then said it would only provide service on the remaining PV Hooper line if all of the available funds were used on that line. WSDOT has since declined to spend those rehabilitation funds under this cloud of uncertainty.

The reasons for this changed market and shortline situation include the increased value of the Net Liquidation Value(NLV) for the line, hence an opportunity cost/return that Watco wants to realize, the successful and creative Ritzville shuttle facility, a real or perceived car shortage possibly affecting traffic volumes (partially due to hurricane Katrina and shifting traffic patterns), the BNSF and UP's emphasis on "operating as mainline railroads" and dedicating power and capacity to that effort especially in a time of increased freight transportation demand, and the concern about requirements for Watco to maintain the lines at Category Level II after sale of the lines, among others.

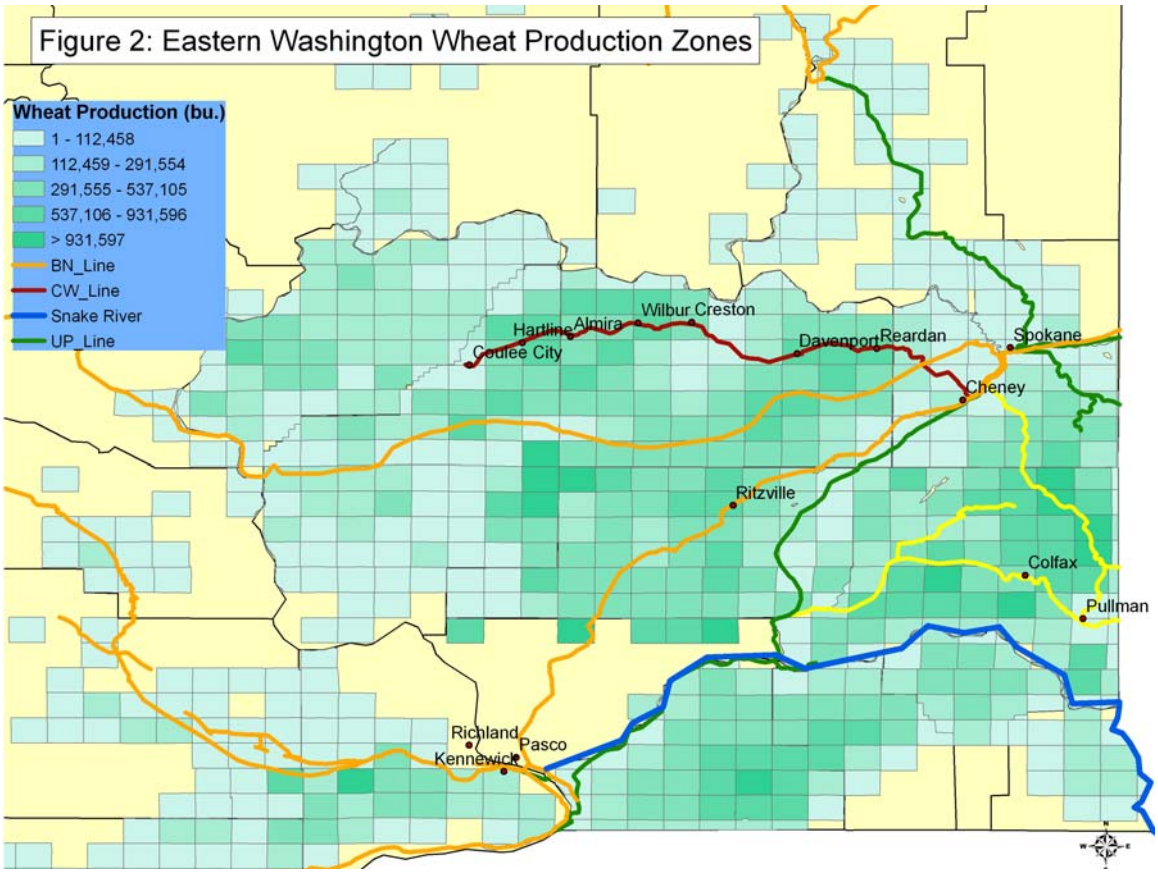
The benefits identified earlier in the due diligence studies may still be in existence to some degree but the answer to the question of "can the CW line become profitable for an operator, Watco or others," is more uncertain. Watco's position, in its discussions with WSDOT, is that it will work with the state and shippers (by offering rates and services) to try and achieve that goal but it requires a private/public partnership to continue service. This current study, as well as studies by Denver Tolliver on road damage and Tom McLaughlin on financial analysis, is designed to address some of these questions.

CW RAIL LINE MARKET ASSESSMENT

Eastern Washington Production Region / Landscape

It is useful and important to understand the wheat production characteristics throughout Eastern Washington in order to fully appreciate the competitive transportation dynamics that are continually evolving within different geographical contexts. These production data at the township level were compiled from a combination of sources. Total state wheat production of 148,247,000 bushels was obtained from the Washington State Agricultural Bulletin and represents the average statewide wheat production over the last ten years. The production volume allocated to each county represents each county's ten year average proportion of state total, multiplied against 148,247,000. Within each county, production was allocated to each township based upon a combination of available wheat producing acres and average yield per acre as recorded by producers participating in state and federal farm support programs. The production volume represented by each county and the statewide percentage attributed to each county are presented in Table 1 and the percentages geographically depicted in Figure 3.

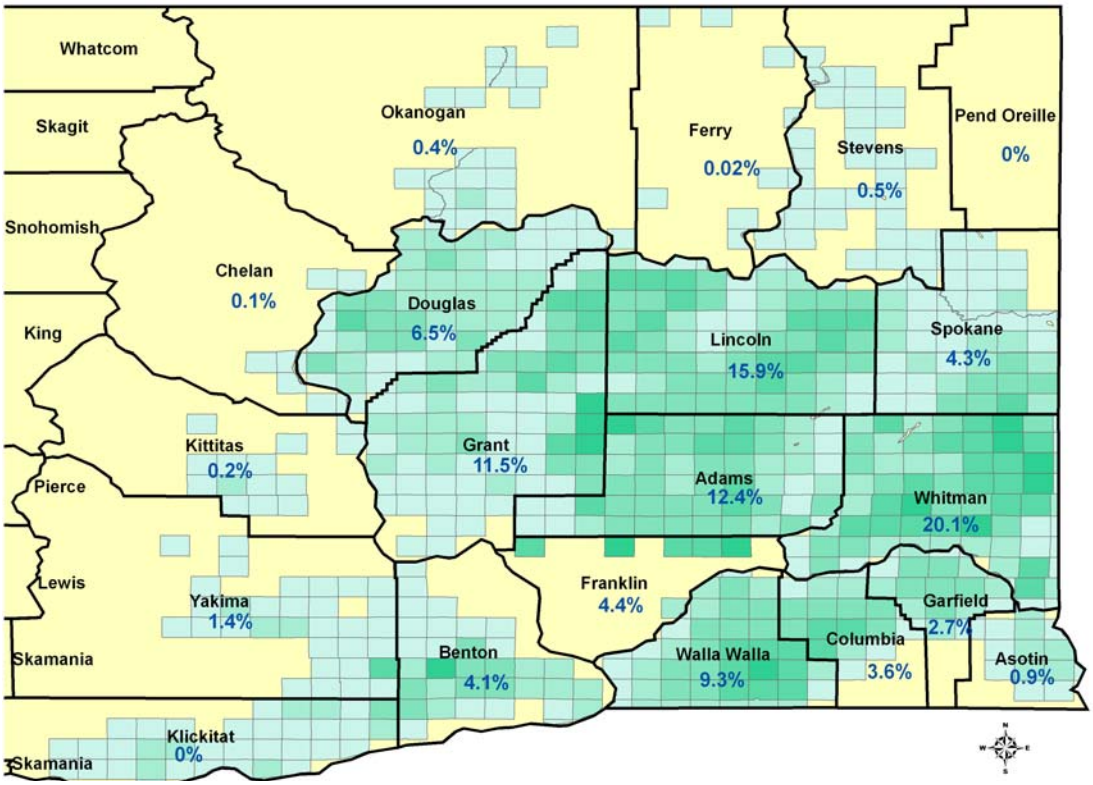
The Palouse region of Eastern Washington is one of the more productive wheat/barley regions in the world, with dry-land wheat yields often exceeding 120 bushels per acre. The concentration of wheat production by township is displayed in Figure 2, with wheat production stretching from western Douglas and Grant counties east to the Washington-Idaho border and from the northern reaches of Douglas, Lincoln and Spokane counties south to the Washington-Oregon border. The intensity of wheat production is visually apparent throughout the region, moving from low intensity light-green areas to the high intensity production townships in the dark-green areas, illustrating the relationship between wheat production intensity and the rail transportation



Source: Wheat production represents 10 year statewide average, allocated to townships based on average yield and acres as specified by producers participating in state and federal farm support programs.

infrastructure. Following a pattern that is relatively consistent with rain precipitation levels throughout Eastern Washington, the western portion of the Palouse displays considerable lower yields per acre and therefore less total production as compared to the regions east toward the Idaho border where soil conditions and precipitation levels are more favorable for yields and total production. This is readily apparent when comparing total wheat production from two geographically large areas such as Douglas and Grant counties to Whitman County, as depicted in Figure 3. Douglas and Grant counties combined represent 18% of total state wheat production whereas Whitman County alone accounts for over 20%. However, while productivity increases to the east, total production in Douglas County alone would generate 2,768 rail cars per year, which

Figure 3: Proportion of Wheat Production, by County



Source: Wheat production represents 10 year statewide average, allocated to townships based on average yield and acres as specified by producers participating in state and federal farm support programs.

is very close to the perceived break-even threshold on the CW Rail line of 3,000 cars reported later in the report.

Geographical Market Conditions Prior to Ritzville Shuttle

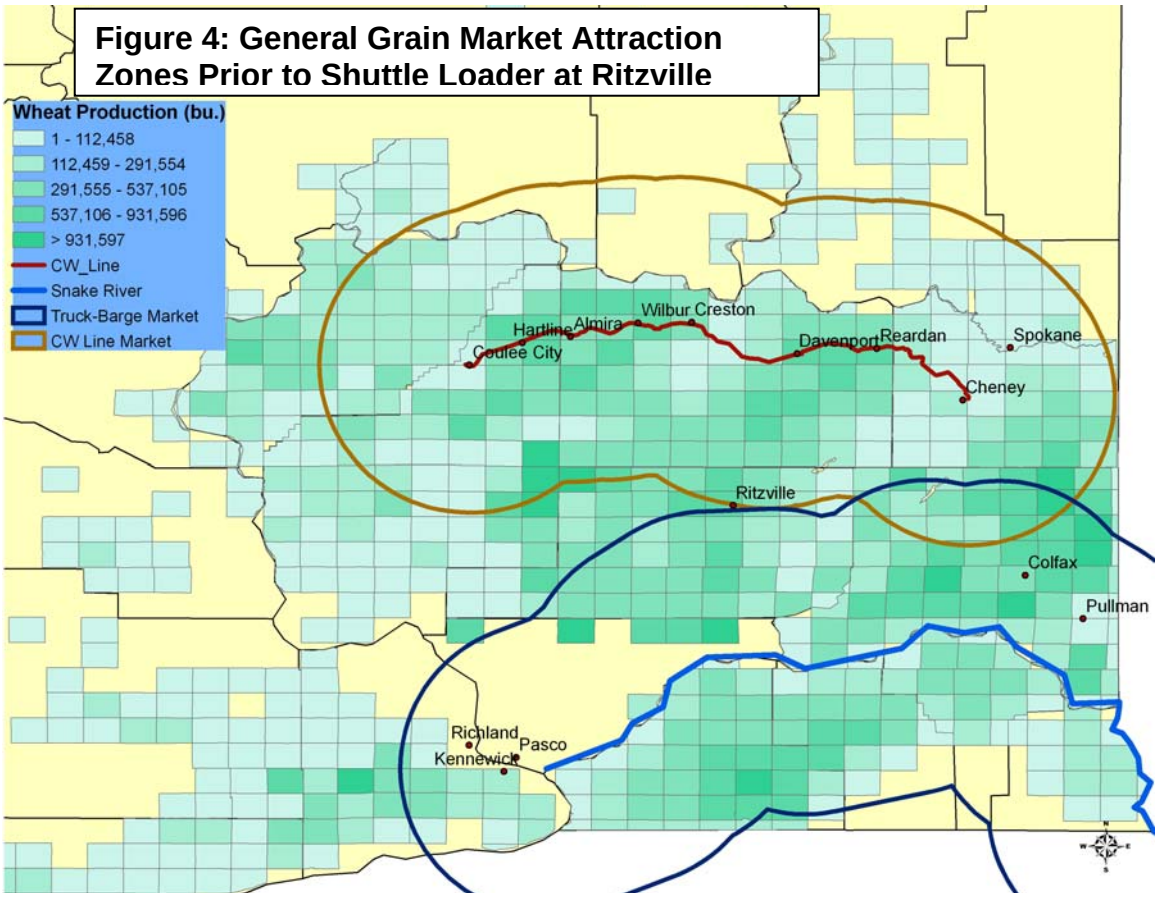
Prior to the construction and operation of the unit-train/shuttle loading facility in Ritzville, Washington, there were generally two market attraction zones for grain movements in Eastern Washington. These market attraction zones are generally depicted in Figure 4, with the more dominant zone in blue following the contours of the Snake River and representing truck-barge shipments that gravitate from upcountry elevators and on-farm storage toward the river. The actual specific geographical boundary of the truck-barge market surrounding the Snake River is continually changing and fluctuating based upon

Table 1: Eastern Washington County Level Wheat Production

County	Production (bu.)	Percent (%)
Adams	18,339,349	12.4%
Asotin	1,329,808	0.9%
Benton	6,026,393	4.1%
Chelan	159,000	0.1%
Columbia	5,355,928	3.6%
Douglas	9,688,926	6.5%
Ferry	32,245	0.02%
Franklin	6,504,497	4.4%
Garfield	4,067,257	2.7%
Grant	16,981,749	11.5%
Kittitas	343,572	0.2%
Klickitat	2,493,952	1.7%
Lincoln	23,589,651	15.9%
Okanogan	563,724	0.4%
Spokane	6,384,415	4.3%
Stevens	670,465	0.5%
Walla	13,800,900	9.3%
Whitman	29,849,293	20.1%
Yakima	2,065,877	1.4%
Ten Year Avg State Production	**148,247,000**	**100%**

Source: Washington State Ag. Bulletin, 2004

current market conditions, world grain demand, time of year and the individual transportation services required by grain merchants/handlers throughout the region. The entrepreneurial ability of individual elevator managers can also reshape this boundary. The second and much smaller geographical grain market in terms of volume shipped is the region to the north surrounding the CW rail line and is represented in Figure 4 by the gold line. While distance and geographical proximity play a significant part in where grain is shipped, likewise availability to rail cars, rail service, available storage/handling capacity, contract terms and price from grain merchandisers also impact the proportion of grain shipped via rail versus truck-barge shipments to the river. However, one would expect that as distance to the river increases for grain producers or elevator operators, rail shipments become the more attractive and competitive alternative, subject to availability and price. Rail shipments from Ritzville did occur prior to construction of the shuttle facility, but were constrained to 26 car units.

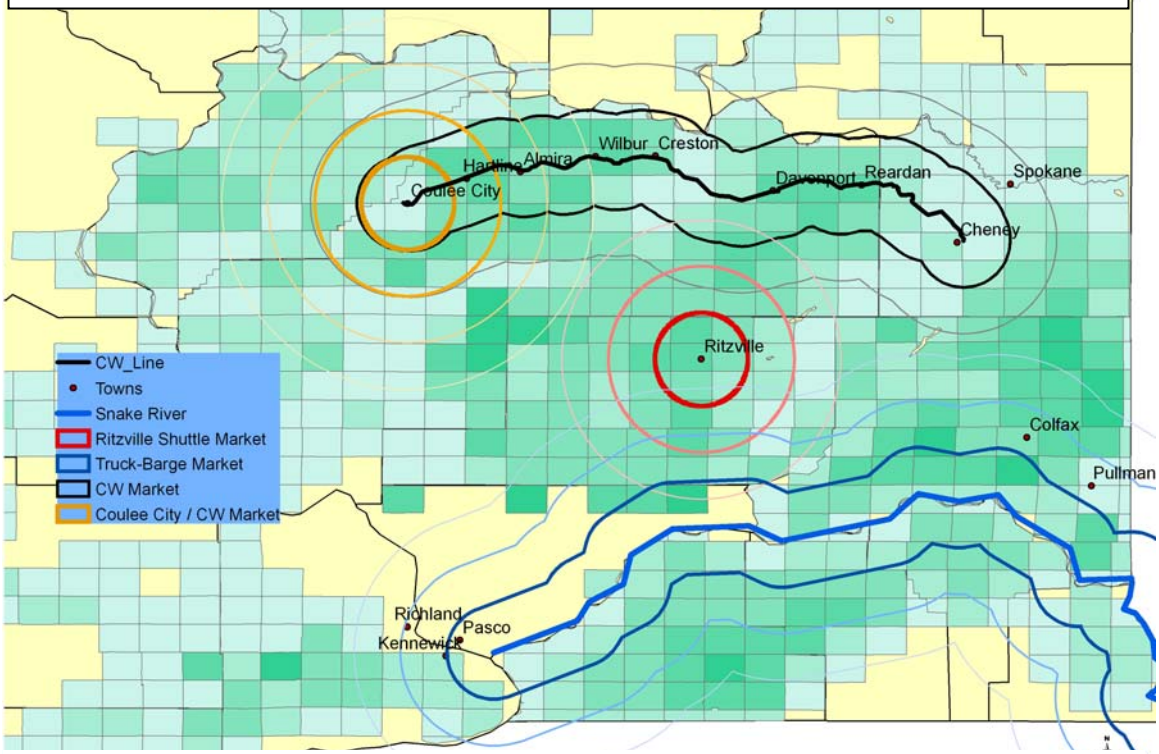


Source: Wheat production represents 10 year statewide average, allocated to townships based on average yield and acres as specified by producers participating in state and federal farm support programs.

Geographical Market Changes with Ritzville Shuttle

Once the 110 unit rail shuttle facility was completed in Ritzville, WA, the geographical grain market landscape changed, as depicted in Figure 5. Primarily this change was to the short-run benefit to area grain companies and producers who now could exercise additional shipping options. These shipping options (truck-barge, truck-rail to CW Line, truck-rail to Ritzville) increased the marketing flexibility and transportation choices of grain elevator operators while the multi-modal competitiveness kept downward pressure on transportation rates. The profit margins to businesses providing the transportation services may become smaller with increased competition for traffic, adding greater incentive for these transportation providers to increase volume and number of shipments when profit margin per shipment declines, thereby reshaping the market boundaries.

Figure 5: Current Grain Market Attraction Zones with Shuttle Loader at Ritzville



Source: Wheat production represents 10 year statewide average, allocated to townships based on average yield and acres as specified by producers participating in state and federal farm support programs.

The facility at Ritzville immediately began to compete for grain volume that previously was shipped either truck-barge to the river and to a smaller degree with grain shipped on the CW rail line. What Ritzville offered was ample storage at critical times (between 3 and 4 million bushels, including outside storage), ability to move large volumes of grain quickly (110 unit train loading facility), scale efficiencies, and a high degree of customer service (not charging for double handling, storage availability at harvest time, partially subsidized truck movements, etc.). As a result, the geographical market attraction zones around the Snake River and the CW Line are now competing with a market attraction zone surrounding Ritzville, Washington, as depicted in Figure 5. As previously mentioned, distance is not the only determinate of how grain shipments flow, but it is a dominant factor to consider. Thus, it is useful to identify the wheat production within certain distance radius of each market attraction zone to provide a better understanding

of market potential within each zone (Table 2). This helps illustrate the choices that grain shippers have made in marketing their product when the production volumes are compared to elevator storage capacities and actual historical movements by transportation mode.

Slightly less than half of the total statewide wheat production, 72,374,249 bushels, is produced within 35 miles of the Snake River. This is one of the main reasons why truck-barge movements represent such a sizeable proportion of total wheat shipments in Eastern Washington. However, there is also ample grain produced in the north Palouse region surrounding the CW rail line. Increasing in distance from this rail line in ten mile increments, 20,778,050 bushels (ten mile radius), 33,786,387 bushels (twenty mile radius) and 48,714,985 bushels (thirty mile radius) are produced. If we convert this grain production volume into train car equivalents, this volume represents 6,202, 10,085 and 14,542 rail cars respectively. The smaller of these three market attraction zones is Ritzville, in terms of proximity to production volume within a ten, twenty, and thirty mile radius. However, over 20 million bushels of wheat are still produced within a 30 mile radius of this shuttle loading facility (Table 2).

Table 2: Wheat Production Volume by Market Zone

Market Zone	Distance Radius	Bushels	Rail Cars[1]	Trucks[2]
CW Rail Line	10 mile	20,778,050	6,202	17,315
	20 mile	33,786,387	10,085	28,155
	30 mile	48,714,985	14,542	40,596
Ritzville	10 mile	4,208,463	1,256	3,507
	20 mile	9,824,575	2,933	8,187
	30 mile	20,784,843	6,204	17,321
Snake River	35 mile	72,374,249	21,604	60,312

[1] Assumes rail car capacity of 3,350 bushels.

[2] Assumes truck capacity of 1,200 bushels and 72,000 pounds.

Table 3: Wheat Storage Capacity for Elevators Served by CW Rail Line

Elevator / Station	Bushel Capacity (000)	Car Loading Capacity
Almira	3,066	26 unit
Belmont	296	3 unit
Cement	1,000	26 unit
Coulee City	2,083	26 unit
Creston	754	26 unit
Davenport	3,778	26 unit
Govan	509	10 unit
Hanson	765	5 unit
Hartline	2,059	26 unit
Hite	697	10 unit
McCoy	380	6 unit
Mondovi	1,073	26 unit
Reardan	1,700	26 unit
Rocklyn	325	13 unit
Whelan	188	8 unit
Wilbur	4,990	26 unit
Total Storage for Elevators Served by CW Line	23,663	

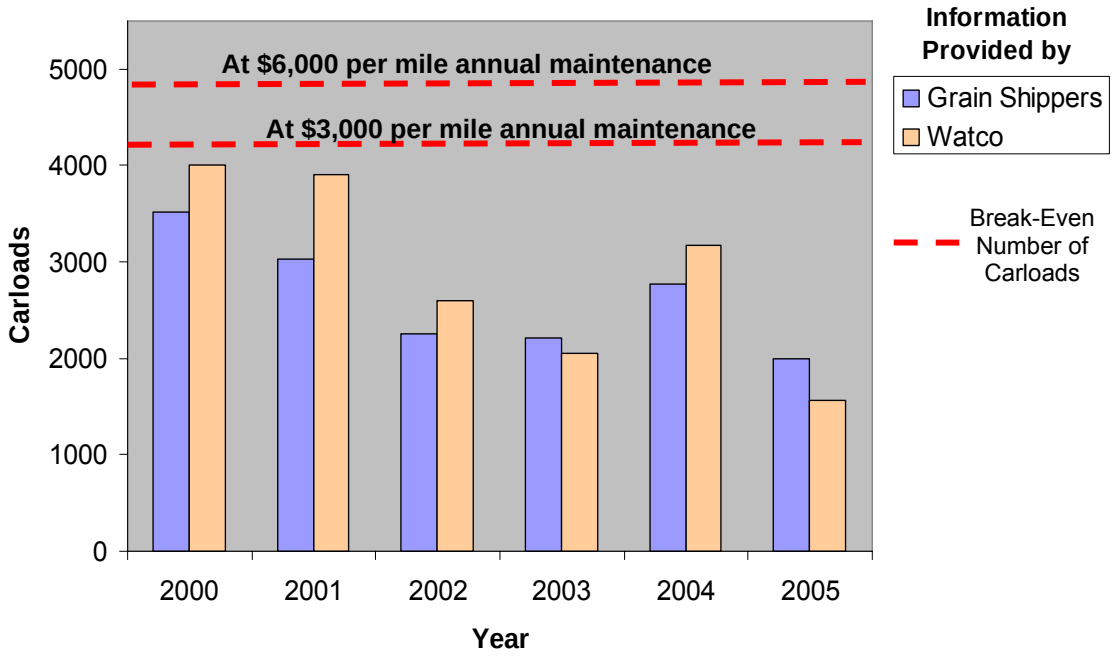
Source: UP/BNSF Grain Elevator Directories

Historical Shipments on CW Rail Line

Grain shipments on the CW rail line did decline between 2000 and 2003, but shipment volumes have increased for 2004 and the first three quarters of 2005, as illustrated in Figures 6 and 7. Comparing shipment volumes on the CW rail line to those on the BNSF originating from Washington State reveals that total BNSF volumes increased significantly for the years 2002, 2003 and 2004 (Figure 8.), a portion of which would include Ritzville shipment. Also, the amount of wheat shipped on the CW line represents less than about 1/3 of the total storage capacity of elevators served by the CW line (Table 3). The two data series presented in Figure 6 represent information provided by grain shippers utilizing the CW rail line and Watco, with some noticeable discrepancies that may be due to calendar versus fiscal year reporting. Also, the grain shippers indicated that 716 rail car orders were already scheduled for delivery but were not shipped due to Watco eliminating rail service on October 5, 2005 (not shown in

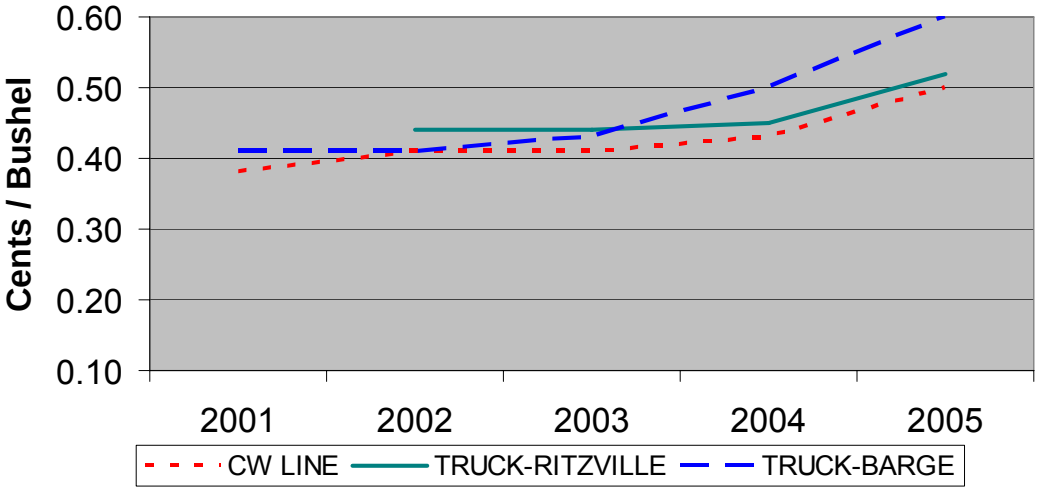
Figure 6). This is an important note to consider when evaluating all 2005 rail car shipments on the CW rail line, including the 2005 bar graphs in Figures 8, 9 and 10.

Figure 6: CW Rail Line Car Loads



The average annual transportation rate for grain shippers on the CW line by shipping option is provide in Figure 7. Between 2001 and 2003, the truck-barge and CW line rates were very close. However, after 2003 the distance between truck-barge and the CW line rates becomes larger, with truck-barge rates growing to almost 10 cents above the CW rate and truck-Ritzville rate. Conversely, the difference between the CW rate and the truck-Ritzville rate become closer, with the CW rate being slightly lower. However, these rates represent averages throughout the year for all shippers which often mask daily/weekly/monthly price fluctuations that influence shipping choices by location.

Figure 7: Average Annual Transportation Rate for Shippers on CW Line



Source: Information provided represents weighted average of responses from survey of all grain shippers on CW rail line.

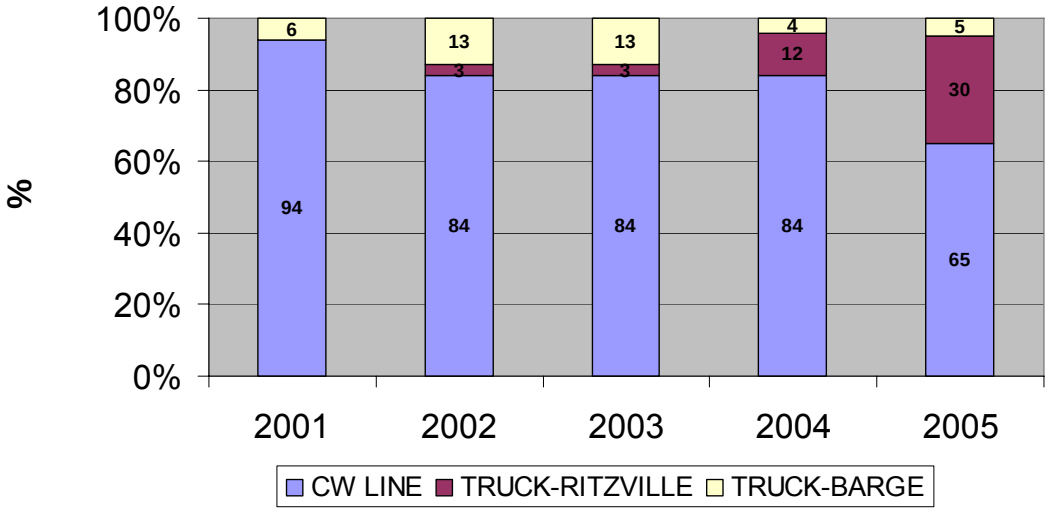
The proportion of all grain intake shipped on the CW rail line by grain shippers located on this line averaged 84% between 2001 and 2004, as illustrated in Figure 8. After 2001, the proportion shipped truck-Ritzville began to increase (3% in 2002) and has continued to grow until 2005 (30% in 2005). This increase in proportion of grain shipped via truck-Ritzville has come at the expense of truck-barge (5% in 2005) and the CW line (65% in 2005). It is important to remember that these proportions don't reflect changes in total volume due to year-to-year crop production fluctuations and also that 2005 was not a complete year due to rail service on the CW line ceasing in October.

The volume of rail car shipments by loading station on the CW rail line is provided in Figure 9. The Almira station represents the largest shipping volume on the line, followed by Coulee City, Wilbur and Hartline stations. Almira has also consistently shipped between 600 and 800 rail cars per year, whereas other stations such as Coulee City and Hartline have fluctuated shipping volumes considerably. However, those stations on the central or eastern portion of the CW rail line represent the smallest proportion of

shipments on the CW rail line due to increased proximity to Ritzville and therefore competition for shipping alternatives.

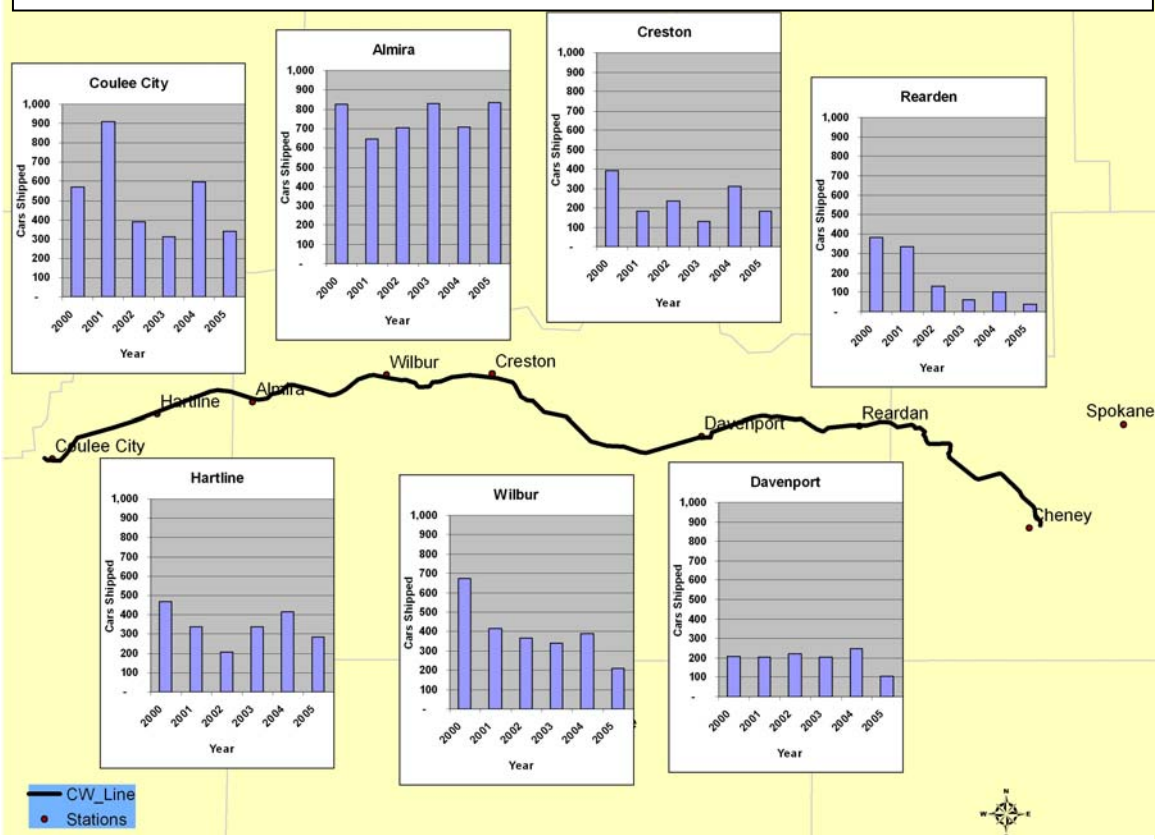
Total BNSF grain car shipments have grown substantially since 2001, reaching just over 12,000 cars in 2004, as illustrated in Figure 10. Much of this growth since 2002 is due to grain shipments from the Ritzville/Templin facility and the favorable shipping rates from this facility as compared to the CW line. The comparison of shipping rates is evident in Figure 11 (from Davenport, WA on the CW line) and Figure 12 (from Ritzville, WA). While the patterns are similar for single, 26 and 110 unit rates, the gap between the 26 car rate and the 110 car rate has widened. There is a difference of $375/car between the Davenport 26 car rate and the Ritzville 110 car rate (2005).

Figure 8: Percentage of Shipments, by Shipping Alternative for CW Shippers



Source: Information provided represents weighted average of responses from survey of all grain shippers on CW rail line.

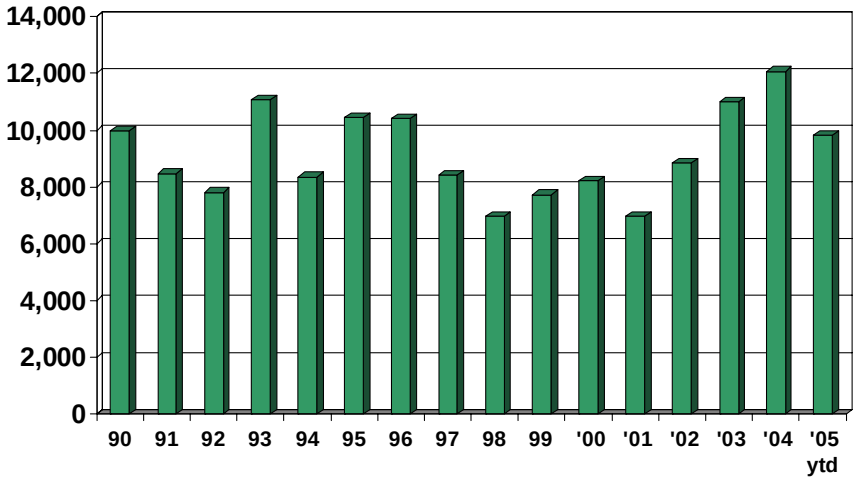
Figure 9: Historical Rail Car Shipments on CW Rail Line



Source: Information provided represents weighted average of responses from survey of all grain shippers on CW rail line

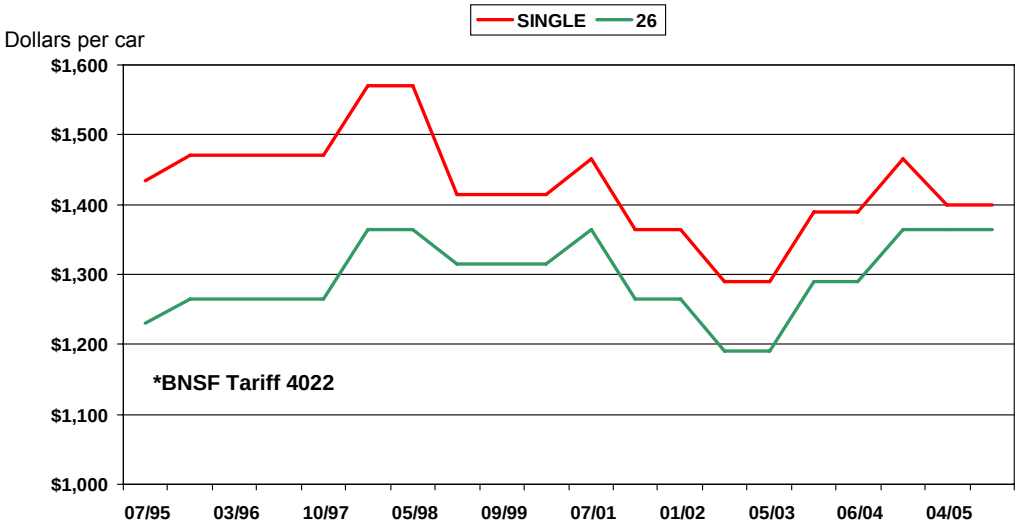
Figure 10: BNSF Washington Wheat Shipments

(units)



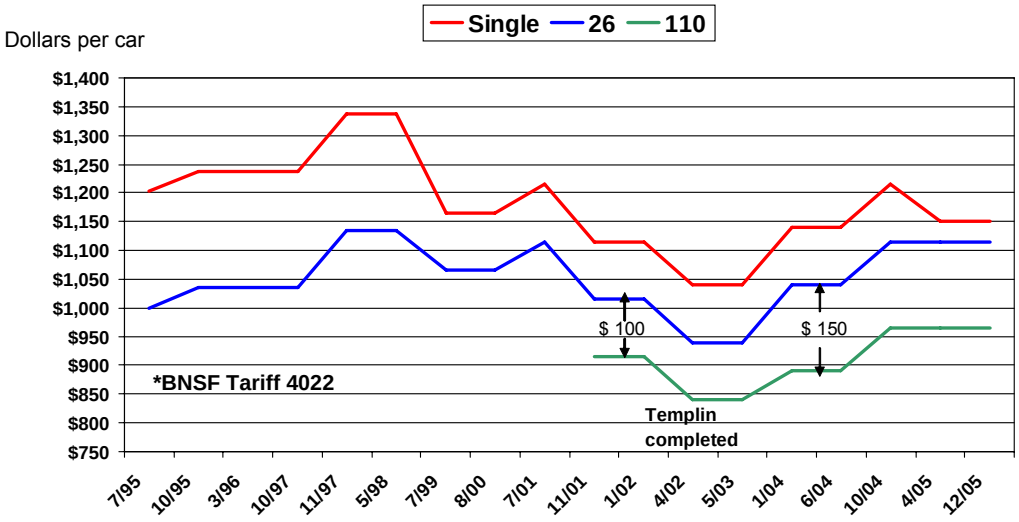
Source: Information provided by BNSF and presented at January 2, 2006 meeting of grain shippers in Ritzville, WA.

Figure 11: Davenport, Wa Rate to PNW on CW Line



Source: Information provided by BNSF and presented at January 2, 2006 meeting of grain shippers in Ritzville, WA.

Figure 12: Ritzville/Templin, WA to PNW (268,000 lb)



Source: Information provided by BNSF and presented at January 2, 2006 meeting of grain shippers in Ritzville, WA.

Grain Shipping/Pricing Dynamics

The marketing and transportation of grain out of the Pacific Northwest is a very complex and sophisticated activity, being conducted by a multitude of decision makers who are continually responding to constantly changing market conditions. A clearer understanding of these different types of shipping customers/decision makers may shed more light on industry wide changes, especially as it relates to modal shipping choices.

Large Grain Cooperatives:

These farmer-owned grain cooperatives handle a large proportion of grain produced in Eastern Washington. Recent consolidation in the grain industry has resulted in significant market concentration, where the top five firms (in terms of volume handled) now represent over 180 grain elevators and 47% of the total statewide grain volume (SFTA Research Report # 5, found at http://www.sfta.wsu.edu/research/reports/pdf/Rpt_5_Dynamics_of_Grain.pdf). This is up from 1994 when the top five firms had 94 elevators and controlled below 29% of the statewide production. The size of these operations opens up many avenues for how they market grain; multi-modal transportation access and availability is critical. Most of these large grain cooperatives have significant investments (in terms of fixed-costs) in both rail and barge infrastructure and equipment with partial or complete ownership in storage/handling facilities located on both rail and river. Maintaining significant investment in both transportation modes helps diversify market risk and also draws grain to regions that may not be least-cost or lowest-rate movements at all times.

One of the more common marketing tools employed by these large grain cooperatives to help minimize price risk related to transportation cost fluctuations is buying and selling rail cars in the open freight market. This is very similar to farmers employing price

hedging strategies with their wheat crop, where grain cooperatives located on rail will purchase rail cars at the beginning of the year or whenever rates are more favorable, in some cases many more cars than they may plan to utilize. Later in the year as harvest time approaches, the grain cooperative has the option of selling those grain cars if the market for cars is tight and prices much higher or utilizing them for shipping grain. This largely explains the lower proportion of shipments on the CW line in 2004 and 2005 by the larger grain cooperatives who benefited by taking a long position in the freight market and then later selling those cars due to extremely favorable conditions and moving grain by the next cheapest option (truck-Ritzville). This is one example where the lowest transportation rate on a given day doesn't necessarily dictate how/when/where grain will move. However, without rail access these large grain cooperatives wouldn't be able to utilize this marketing tool which would significantly limit their marketing flexibility. Given both the size of grain volume handled and the importance of participating in the freight market for the large cooperatives, they also may be the most receptive to volume commitments on the CW line in order to help assure the lines existence.

Small-Medium Grain Cooperatives:

These types of grain cooperatives were much more prevalent 15-20 years ago, prior to the industry wide consolidations that have produced the larger grain cooperatives. These operations are generally much smaller in scale, handling less than half the volume of larger grain cooperatives and located in specific regions. These cooperatives are also much less likely to have investments in both rail and river transportation infrastructure and facilities, but rather one or the other. Also, due the limited size and scale, they are less likely to engage in positions on the freight market and are more likely to ship grain by the least-cost modal option. This is characteristic of grain cooperatives

located in the central to eastern section of the CW rail line, where a significant share of their shipments have moved to the Ritzville shuttle loading facility over the last two years. Without being able to take advantage of the freight market and the increased rates reflecting national car shortages closer to harvest, these shippers are at a distinct disadvantage, especially when rail car availability is problematic as it was for much of 2004. Thus, these types of operations are much more likely to move grain to where the rates are the lowest but also benefit from having the multi-modal competition present.

Large Grain Producer Operations:

Consolidation has also occurred for grain production operations throughout Eastern Washington. Many of these producers are members of a grain cooperative and market some portion of their crop through these grain elevators. However, some of the larger operations possess a significant amount of on-farm grain storage and also own their own trucks and ship directly from the farm to barge-loading facilities along the Snake River. While these producers frequently engage in option and hedging strategies, they are not large enough to participate in the freight market (buying/selling rail cars). Generally speaking, this type of shipper moves grain in the least cost fashion but relies upon different modes to maintain competitive shipping alternatives.

Small-Medium Grain Producer Operations:

These producers are typically older farmers, with farms ranging in size from 1,000 to 5,000 acres and market the majority of their grain through their local cooperative. These producers are less likely to ship truck-barge directly to a river port unless they are located near the river, but generally ship to the closest elevator. They also have less investment in larger truck equipment that would allow significant transport by truck.

River Transportation as a Continuing Competitor to the CW Line and Ritzville

Barge transportation on the Columbia-Snake obviously serves as the competitor to the railroad, both the mainline and the CW line, conditioning the rates that can be charged and the areas that will be served. This competitive relationship between truck-barge and rail movements is the original business model under which Watco anticipated a market opportunity. While they did not anticipate competing with the shuttle loader at Ritzville, the dynamic, ever-changing business environment requires adjustment to changing market conditions. These types of business dynamics and market responses will continue and the river will continue to play an integral role.

The principal and critical constraint on the barge system is a need for continued dredging at the entrances to some terminals and in some parts of the navigation channel. The U.S. Army Corps of Engineers has a plan to provide the required dredging, costing about $2.1 to $4.9 million per year over a 70+ year period, and this plan was partially implemented this winter, due to a compromise between the Army Corps of Engineers and the Tribes/environmental interests. Without dredging, the barges had, in some cases, been loaded light (as much as 35% light), decreasing efficiency and increasing per unit costs to shippers. Shippers and ports had stepped in and contracted for private dredging until this compromise was reached. The future status of this effort remains uncertain.

A major potential impact is the continued ruling by a U.S. District Court judge that a federal salmon recovery strategy adopted in December 2000 is illegal because it relies improperly on actions that are not “reasonably certain to occur”. Judge James A. Redden said that the reliance on certain federal and non-federal activities results in a false assessment that federal Columbia/Snake river hydro-system dams can be

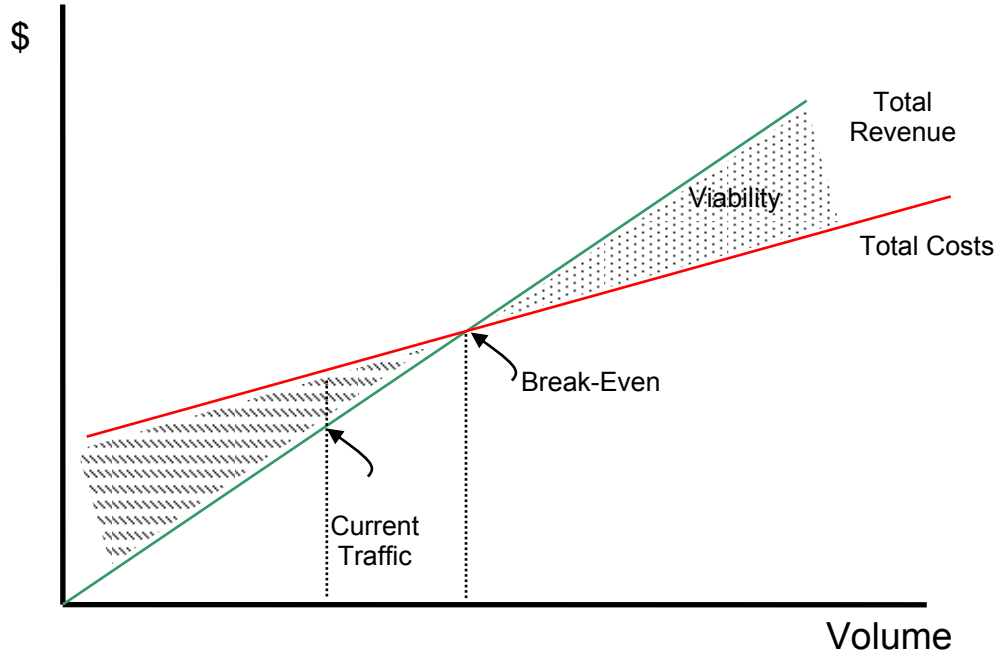
operated as planned without jeopardizing the existence of salmon and steelhead stocks listed under the Endangered Species Act. Negotiations continue as to whether dam removal is to remain an item under discussion.

The uncertainty surrounding both the halt in annual dredging and the renewed possibility (though extremely low) of breaching of some dams has a direct effect on the CW line. First, the competitive position of the short line railroad is greatly enhanced if either of these actions continues. Secondly, in the extreme case, the need for service from the line is greatly increased since loss of dredging or implementation of a river draw down will both necessitate hauling grains and products to the Tri-City area, if barge is to be accessed and efficiently used in the future. If barge is no longer competitive, then rail movement the full distance to the port becomes necessary, and, importantly, new traffic for both the originating CW line and the long haul Class I railroads is created. Thus, the value of maintaining the three-legged stool of three modes as part of the total transportation system becomes obvious.

FINANCIAL / BREAK-EVEN ANALYSIS

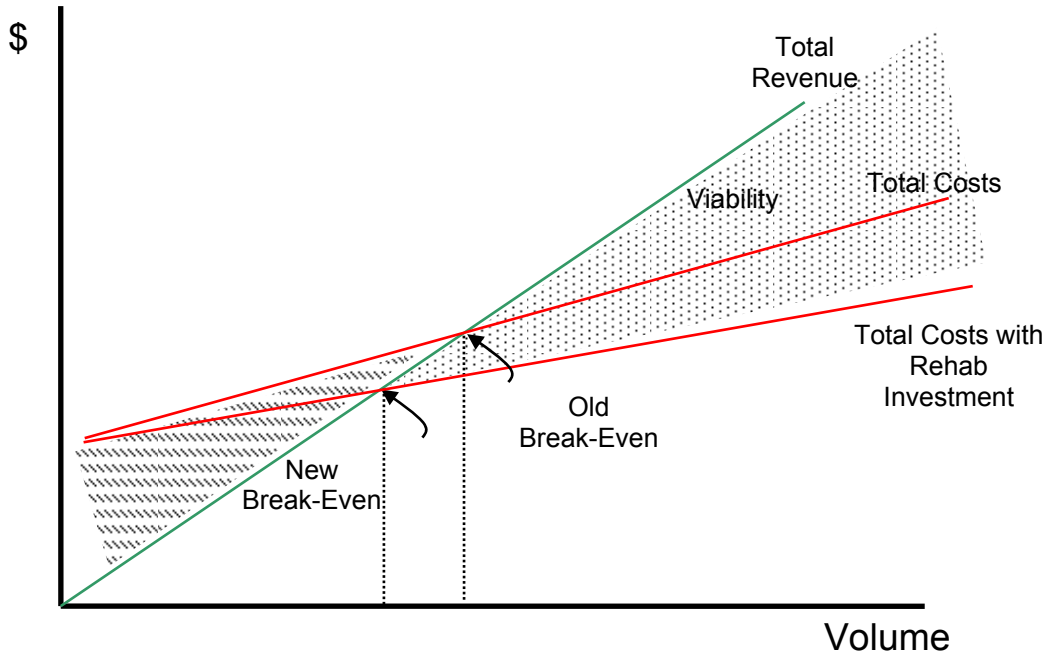
The heart of economic feasibility and sustainability of a railroad is indicated in Figure 13. As a fairly reasonable example of the situation surrounding the operation of the CW line, consider the slope of the revenue line to be around $400 per car (actual realized rates vary but generally are around this figure). The cost line indicates the increase in total costs of operation, including a contribution to any operating agency (Watco in our example), as volume increases. Initially at low levels of traffic, the costs are significantly above revenue, resulting in a loss to the railroad firm. As increased volumes of carloads are realized on the line, the point is reached where revenues equal costs, including the corporate contribution, or the break-even point.

Figure 13: Break-Even Analysis



If, as indicated in Figure 14, the costs of operation are decreased by rehabilitation investments, from exterior sources, the break even volume could actually shift to a lower amount. So, under the lowered cost scenario, the initial volume of cars generates a significant difference between revenue and costs, an amount that would be available for increased maintenance investments for each mile in the line.

Figure 14: Break-Even Analysis with Rehabilitation



Examination of the pro forma details indicates that, in addition to the decrease in variable operating costs, other "fixed operating expenses" could be decreased. Needed track expenditures ($167,564), after rehabilitation, might go down, subject to the need to maintain the track at class level II. Rail car leases ($247,360) could possibly be decreased by the use of negotiated State owned Grain Train cars. Property taxes and insurance ($35,840) might decrease if the track is owned by the State or a shippers

association. In sum, the cost decrease estimate may be conservative, given the provided numbers from Watco.

Pro forma information for the 2005 operating year was provided by Watco to allow specific examination of this financial situation. This brief analysis, done by Tom McGlaughlin of Tyee Partners, LLC, is based on those figures as presented by Watco, with no actual books or tax records being audited by Tyee Partners, Inc.

In Table 4 below, from Tyee Partners, LLC, a loss is identified. Tyee goes on further in the analysis to determine, using the projected cost figures provided by Watco what the volume would need to be on the line to be at break even for the year, including the corporate allocation of $81,618. This volume was determined to be 2,995 cars for the year. In the analysis, revenue and variable costs of operation are adjusted to reflect the new movements, but assumes no improvements to track or operations at the higher level.

Based on Watco Projections, What are the Impacts on Profitability of Increased Volume or Earlier Track Rehabilitation?

Table 4: CW Line Financial Projections: Two Scenarios

	Projected (2005)	Volume Increased	Track Rehabilitation Accelerated
Car Loads	2,150	2,995	2,150
Revenue	$960,214	$1,337,600	$960,214
Expense			
Variable Operating	$577,957	$805,108	$384,613
Fixed Operating	$450,764	$450,764	$450,764
Total Operating	$1,028,721	$1,255,872	$835,377
Operating Profit (Loss)	$(68,507)	$81,729	$835,377
Corporation Allocation	$81,618	$81,618	$81,618
Net Profit (Loss)	$(150,125)	$111	$43,220

Further analysis was done focusing on an improvement in operational efficiency if a rehabilitation investment of $8,554,450 is moved up from 2005-11 to near term of 2005-07, with no changes in the projected 2005 volume of 2,150 cars per year. The analysis assumes labor cost savings of 50% due to increasing the train speed on the track from 10 mph to 25 mph (Tolliver in his earlier analysis found that as density increased, the cost savings per car were around $75. At 2,150 cars, those savings would be $161,250, within $32,000 of the Tyee Partners, Inc. estimate, generally corroborating the estimate in the Tyee analysis.) Under this scenario the CW line generates some revenue over operating costs.

These pro forma figures from Watco, and the initial analyses by Tyee Partners, Inc., allowed these authors to further consider an additional scenario where volume of cars increased to 2,995 and the lowered operating costs from earlier rehabilitation investment, as provided in Table 5. The analysis shows that under this situation the CW

line can generate $379,618 over operating costs, with a net, after Watco's corporate allocation of $81,618, of almost $300,000.

It should be again noted that the split between operating variable cost and operating fixed cost is not explained, along with a depreciation charge, in the Watco financial information. Fuller information would allow more detailed economic analysis, and level the amount of information available for negotiations between relevant entities.

Based on Watco Projections, What are the Impacts on Profitability of Increased Volume and Earlier Track Rehabilitation?

Table 5: CW Line Financial Projections: Combined Volume Increase and Rehab

	Projected (2005)	Both Volume Increase and Accelerated Rehabilitation
Car Loads	2,150	2,995
Revenue	$960,214	$1,337,600
Expense		
Variable Operating	$577,957	$507,218
Fixed Operating	$450,764	$450,764
Total Operating	$1,028,721	$957,982
Operating Profit (Loss)	$(68,507)	$379,618
Corporation Allocation	$81,618	$81,618
Net Profit (Loss)	$(150,125)	$298,000

Using Actual 2005 Figures from Watco, What is the Breakeven Levels, the Profit or Loss, and the Effect of Varying Levels of Maintenance?

Tyee Partners, LLC was then asked to re-examine the numbers offered by Watco as reflected in the actual year-end reports (Table 6). Specific attention was paid to:

- The revised financial information from Watco for 2005 actual results.

- Break-Even levels with full track maintenance and rehabilitation spending decreasing in increments of $1,000 from $8,000 to $3,000 and noting the assumptions.

- Operating profits (losses) at carload levels of 4,000, 3,500, 3,000 and 2,500 with full maintenance spending at $8,000 per mile annually.

Palouse River and Coulee City Railroad, CW Branch

Comparative financial reporting differences:

Table 6: Revised Financial Information from Watco for 2005 Year-End Actual

	2005 Projected	2005 Actual
Revenue (Carloads)	$960,214	$652,256
Leas Car – Per Diem	$172,896	$0
Carloads	2,150	1,561
Average Revenue/Carload	$446.61	$417.84
Average Variable Cost/Carload	$268.82	$323.70
Number of Locomotives	3	4
Lease Car Expense Corporation Allocation	$222,595	$0
(Loss)	($150,125)	($266,592)

Tyee conditions the presentation of the above numbers offered by Watco by stating information that would be necessary for more complete analysis of such data:

> *"Why would an additional locomotive be added (3 to 4) when carload volume has decreased by 27%?*
>
> *Why have variable costs per car load increased from $268.82 to $323.70? This is a 20% increase based on information supplied within a 5 month span of time.*
>
> *If the line was shut down on October 5, 2005, the results as presented appear to not reflect the true operating costs, but include costs associated with non-operating periods."*

Tyee further states:

> "*When interim financial statements are prepared and submitted to outside parties, it is a normal operating practice to footnote significant reporting changes explaining restatements, reclassifications, or transfer of revenue or expenses to other categories. In these statements, there are no explanations related to the reporting changes or significant differences."*

How many carloads does the CW Branch Operation need to ship to Break-Even, at different track maintenance spending levels?

Assumptions:

- *All track sections will be rehabilitated to Class 2 levels to enable 25 mph speeds on all sections of the track.*
- *The track rehabilitation cost is reported as $8,544,450. However, this level of spending may not be sufficient to restore the track entirely to Class 2 levels. This amount is based on 2003 dollars and is understood to represent the cost to restore 77% of the track.*
- *The speed and operating efficiency will decrease in direct proportion with decreased spending on track maintenance resulting in deteriorating track condition.*
- *Average car load revenue of $417.84 remains constant.*
- *Average variable costs per carload would gradually increase at the same percentage change as the decrease in track maintenance costs. It is assumed the cutbacks in track maintenance will reduce speeds on all or some sections of the track.*
- *If track maintenance costs are not maintained at national average levels, the track rehabilitation will deteriorate back to the current condition.*

Track Maintenance Spending	Break Even Volumes	Variable Cost per Carload
$8,000	4.812	$ 207.40
$7,000	4,735	$ 226.79
$6,000	4,640	$ 246.17
$5,000	4,521	$ 265.55
$4,000	4,369	$ 284.96
$3,000	4,163	$ 304.32

As spending decreases on track maintenance, Tyee's analysis shows the Break Even point will decrease because spending is being deferred. There will be offsetting operating efficiency losses, but the real cost comes at the point when the track condition deteriorates back to the Class I or 10 mph condition. The track rehabilitation cost in 2003 or 2004 dollars is $8.5 million. The impact of spending less than the national average on track maintenance has short term operating benefits to an operator, but has significant long-term rehabilitation impacts to the owner, especially if the CW Branch is purchased by Washington State.

What is the Impact on Profit (Loss) at Different Levels of Traffic, With $8,000 Annual Maintenance Per Mile?

Table 7: Profit (Loss) with Operating levels at 4,000, 3,500, 3,000, and 2,500 Car Loads and Full Maintenance Spending at $8,000 per mile Annually				
Carload	4,000	3,500	3,000	2,500
Revenue/Carload	$417.84	$417.84	$417.84	$417.84
Variable Cost/Carload	$207.40	$207.40	$207.40	$207.40
Track Maintenance	$8,000	$8,000	$8,000	$8,000
Profit (Loss)	($170,832)	($276,053)	($381,274)	($486,495)

The Tyee analysis shows the volumes above at the current average carload revenues and variable cost will yield operating losses, assuming full track maintenance costs to maintain the track condition at Class 2 or 25 mph levels.

Tyee identified issues of continuing concern about his analysis and the CW line, from his perspective:

- "Increasing volume will most likely require further price concessions

- Limited opportunity for increased volumes or new business in the region
- Strong competition (Ritzville Shuttle Loader)
- Assumes WSDOT cost of $ 8,544,450 for Track Rehabilitation
- Assumes track maintenance costs will be maintained at $8,000 per mile annual average national standards
- The current operating method, competitive market, and full track rehabilitation make it difficult to realize an adequate Return on Investment (ROI) for a private company operator
- Watco shows Leased Car – Per Diem revenue of $172, 896. The source and continuation of this revenue source needs to be understood."

Tyee then offers the following conclusions:

In my professional opinion there are several issues that need to be addressed:

- *"The information supplied by Watco is confusing and needs to be clarified. The September information clearly states they are actual results from January – July and projected for August – December. The more recent information has been submitted as being actual results for 2005. Most trend financial statements show actual results by month. The format supplied by Watco appears to be based on annual numbers and then divided by 12 for monthly totals. There is no source data to know where the annual numbers come from or the ability to tie the numbers back to source data.*

- *Significant cost changes need to be explained. Operations on the CW Branch were ceased on October 5, 2005. However, the variable costs as reported by Watco, indicate these costs continued, which makes no sense. If train movement ceases, so should labor, fuel, and other variable cost components. If staff were reallocated, this needs to be stated in a footnote. When operations ceased in October, why did the number of locomotives increase from 3 to 4 from the September reports to the final year-end reports?*

- *WSDOT is considering a large investment in the purchase of the CW Branch and/or the financial subsidy of the PCC Railroad. These decision should be based on an in-depth due diligence of actual information, not projected Performa*

information, supplied by the seller (Watco). A normal acquisition of a business would be based on detailed information, such as actual Trial Balances, Monthly Income Statements, Balance Sheets, and supporting details reports such as Payroll Registers, Invoice Registers, etc. As part of the due diligence process , the seller of an entity is required to furnish documents that have been audited by an independent third party (CPA firm) or have been filed with government agencies (tax returns). The same process should be followed as it relates to the PCC Railroad and the CW Branch."

In sum, these authors agree with the Tyee analysis showing the expected current viability of the existing CW line is decreased as assumed maintenance per mile is increased. At the national average of $8,000 no further rehabilitation is expected to be required since consistent maintenance eliminates the need. Further, if the Watco figures and suggested experience are realized, significant increases in traffic would be required to support the national maintenance average of $8,000 per mile.

MARKET POTENTIAL

The viability of any railroad or specific rail line is heavily determined by the traffic on that line. Increased traffic lowers per car costs and increases the revenue on the line. The markets and attendant traffic available to the CW line are heavily but not totally reliant on the agricultural industry in the region. The immediate goal is to serve the current customer base on the CW line, which are predominately grain shippers from a region with very stable wheat production volumes. It is useful to identify near-term market opportunities which may impact the economic viability of the line. As indicated in the following table, and based on the interviews and discussions in the region by these authors, it appears that the previously suggested break even level of 3,000 -4,000 or more cars may be attainable.

Full Year of Operation

Starting with the movements on the line from the Watco original data, in 2005, of 2,150 cars (1,561 if latest Watco numbers are used) several sources of market potential movements are evident. The first increase is expected from having the railroad and power on the line for a full year, rather than serving the artificial volume in 2005. In October 5, 2005, Watco pulled the power from the line and shut it down. Shippers indicated that they had cars loaded and ready to go, and even partially sold, at that time. Quick negotiations with Watco allowed power to be made available to at least move those loaded cars. No further service was available the rest of the year, continuing into the present.

That time period of October, November and December include three of the four highest volume months in the typical shipping year. If just the average of the first nine months were moved during this shut-down period, an additional 716 cars would have been moved. No market conditions were identified in the interviews to suggest this is unreasonable.

Scoot Train Proposal

The above recovery in car loads is based on simply having a full year of operation and shipping. The possibility of this recovery occurring is further enhanced by a new shuttle arrangement currently under discussion among the BNSF, The Templin-Terminal at Ritzville, The PCC railroad, local shippers and the WSDOT. It involves using 78 car "Scoot-Trains", essentially a shuttle movement, to move grain on the CW line to the 110 car shuttle loader facility at Ritzville.

Potential economies for the Ritzville facility arise from moving 270,000 bushels in 78 cars in one day of the week rather than 235 truck loads over five days of the week, reducing labor cost and congestion and decreasing reliance on energy impacted truck rates. The shortline shippers save a competitive mode, avoid shuttle construction costs as well as the costs of refurbishing rail elevators into truck friendly elevators. Watco regains traffic, at a cost efficiency movement, and may eliminate incentive payments to the shippers. Alleged benefits to the State and to BNSF have also been identified by the proponents of this concept.

This concept, while only in the talking stage at this point, does offer significant potential recovery of traffic to the CW line, with competitive rates to truck-barge movements and

efficiency gains for most parties. Contracts and commitments will have to be negotiated and determined.

Geiger Spur: Traffic and Economic Growth

Some of the proposed traffic for the CW line is "probable" at best and only "possible" at worst. The traffic from the new Geiger Spur, however, has sizeable potential. This traffic will add directly and possibly substantially to the revenue picture of the CW line.

The Geiger Spur currently is a five mile long rail line that serves 10 rail dependent customers. The rail line was in jeopardy due to track conditions as well as the desire of Fairchild Air Force Base administration to close the Spur due to security reasons. The decision was made by local authorities and economic development interests to build a new line, a connector to the CW line four miles to the south. Partial funding, from State, BNSF, local and Federal sources, has been identified and construction bids are to be requested this summer, 2006. Right-of-way is progressing with affected parties being in favor of the extension of the spur. Permitting and design work is near completion as well. The actual construction decision will wait for the extra funding that may be needed for property acquisition and the investment of those available funds into the actual final construction.

When constructed, there is long tem potential to increase industrial traffic on the CW line. Movements on the line currently, even in a period of uncertainty for existing and potential manufacturers and shippers, have been 250-300 cars per year, with near term expectations of 400 cars a year.

A short-term opportunity to increase current industrial rail car volume is currently under discussion in the Spokane region. Rabanco, a mover of products such as ash and waste material from the Spokane Waste to Energy plant, has an efficiency problem with its current transfer point, essentially within the BNSF rail yard. It incurs waits of up to eight hours and is sometimes "lost" among the container traffic of the switching yard. If this proposal, and it is only under discussion at this time, were to become a reality, between 3,600 and 7,200 cars would come to the spur and the CW line. And, depending on the location of the transfer facility, the trucks servicing this movement would not have to drive through the denser Spokane areas. While speculative, it does involve a major company with an ongoing contract with BNSF and the County, a need to correct a significant cost and efficiency problem, a long term disposal site (Roosevelt landfill in Klickitat County), an improvement in traffic in the Spokane area and a traffic movement that appears will not go away.

The Geiger Spur project has direct ramifications for the existing and proposed movements on the CW line. The community believes that preserving rail line access is an important economic development catalyst, both in maintaining existing economic activity and jobs, but also as a spur to further development (also portending more shipments on the line). Almost 600 jobs are directly or indirectly dependent on rail service in existing industries, adding over $66 million in the Spokane area economy. The payroll for the rail dependent industries alone is over $11 million.

Many developable acres exist in the region adjacent to the new Spur and the development of these properties may be enhanced by continued and improved rail service. With the new rail line, the area between Craig Road and the east boundary of Fairchild AFB may become attractive for industrial zoning/development and would

provide a protected area around the two airport properties to restrict further residential development that is not compatible with air operations, while increasing the security of the area. In sum, there is long term potential to increase traffic on the CW line.

Transformers and Heavy Equipment: Security and Traffic

The Bureau of Reclamation has determined that up to 46 transformers will be needed at Grand Coulee Dam over the next six years, equipment that is over-height and over-weight and would need special permits and carriers to travel on state highways. The transformers are manufactured overseas and shipped to the Odair, Washington site, near Coulee City, Washington by rail. The Bureau further notes that the Army Corp of Engineers also has used this site for shipment of equipment for Chief Joseph Dam at Bridgeport, Washington and that the Bonneville Power Administration (BPA) relies on being able to make emergency transformer replacements at Grand Coulee, using the Odair site as an offloading point for BPA's heavy rail car.

Though these 'extra ordinary' movements are not large in volume, they will generate additional revenue since they are expected to be moved at significantly higher rates than a grain hopper car. More so, they are quite important in security and regional economic impact if the transformers can not be moved. It appears that at least one regional trucking firm has the physical capability, though not the past experience, to move these transformers and other heavy equipment if the CW line were not available. For analysis and to determine the value of having the CW line available, the rate charged by the trucker and the fees paid by the trucker for any road damage can be used as a baseline indicator (such tentative information is not available at this time). Management of the Dam is now exploring alternate routes including shipping by rail on the Columbia River and Cascade Railroad to Brewster, or on the BNSF mainline to central Washington.

Bio-Diesel Production

Various parties have discussed the possibility of locating a crushing plant on the CW line. This process, where canola and other crops would be transformed into oil and later blended with diesel fuel to create a bio-diesel fuel mix, may receive a boost for near term production from the legislature. The House recently approved an immediate $9 million emergency loan package. Significantly, under that bill the Spokane Conservation District and the Odessa Public Development Authority would be two recipients of the loans. Though the locations of any crushing plants have not been specified, there is potential to site new plants that would generate additional rail traffic on the CW line. The measure, part of a major movement to encourage bio-fuels production, passed the House on an 89-7 vote and is now with the Senate for consideration. A related bit of legislation, also designed to encourage bio-fuel production, is potential provision of state property tax relief to property owners who grow raw materials for bio-diesel.

In Sum, the market potential traffic appears as below in Table 8. The combination of the recovery of the fourth quarter of traffic, the Scooter Train shuttle and the Geiger Spur movements can be expected to move shipments at or above 3,000 cars per year in the near term (for both projected and actual values provided by Watco). If Rabanco or increased growth in the Geiger Spur area occurs, as predicted by local sponsors, there is some opportunity to growth in rail car volume, but this is very uncertain.

What is the Short Term and Long Term Potential Traffic for the CW Line?

Table 8: Sum of Market Potential Rail Cars

Market Potential Traffic	# of Carloads	
Base 2005 Movements	2,150[1]	1,561[2]
Full year operation and scooter-train	716	716
Geiger existing traffic on spur	300	300
Potential Long-Term Movements		
Geiger growth/potential traffic	700	700
Rabanco shift	3,600 – 7,200	3,600-7,200
Transformers	6	6
Total Market Potential	3,166 + 706 + ??? = 3,872 +	=3,283+

[1] Projected provided by Watco
[2] Year end Actual provided by Watco

INVENTORY OF PUBLIC BENEFITS

The easiest answer to the question of what public benefits exist is ”whatever is of service to the state and region”. However, this study and others done by these authors have been done and information developed that can identify more specifically the possible benefits to the public and the State of maintaining the operation of the CW line.

The most commonly cited public benefit is the 1,561-2,150 or more carloads that still move by the railroad and do not move on the highways in the region. This magnitude of carloads, if transported by truck would generate up to 6,600 truckloads in the region around the CW line. Some of these would be both short and long hauls (20 to 91 miles) to the shuttle train facility and others might be consistently longer hauls to the river. In all cases those movements would be new stress to the roads, stress that results in accelerated wear on those roadways. Even the short haul movements to the shuttle loading facility are in heavy trucks on some roads that were not built for that level of traffic nor weight of truck, resulting in “pockets of destruction” in some counties and some State highways.

Denver Tolliver from the Upper Great Plains Transportation Institute has completed a targeted analysis of highway pavement impacts in the event that the CW line is abandoned and this traffic is redirected onto county and state highways. Tolliver offers the following informative summary of his findings (For the full report, see Appendix D).

> *The purpose of this study is to estimate the highway impacts resulting from traffic diversions from the Central Washington (CW) rail line. In 1999, approximately 4,300 carloads were originated from stations on the CW line. Another 3,971 carloads were originated in 2000. In comparison, only 2,150 carloads were originated in 2005. With the exception of a few carloads of farm implements, grain is the only commodity that is regularly handled on the line. Apparently,*

much of the traffic originated during 1999 and 2000 has shifted to trucks and is already moving over highways in the region.

***Most Likely Post-Abandonment Scenario**. If the CW line is abandoned, traffic that is currently moving by rail will be trucked to barge transfer facilities or to the shuttle-train terminal in Ritzville. In order to identify the most likely post-abandonment destinations and potentially-impacted highways, the cost of transshipping grain via Ritzville was compared to the cost of transshipping grain via river ports. The comparison considered trucking cost to the transshipment location, transfer cost, and rail and barge rates to Portland and Kalama. When all things are considered, Ritzville is the most likely post-abandonment destination.*

***Impacted Routes**. The shortest path was identified from each station to Ritzville. Many of these routes include county roads. The estimated costs are a mixture of state and county road impacts. Impacted county roads include Kiner, Monson, Rosenoff, Waukon, Rocklyn, and Danekas. Impacted state highways include SR-17, SR-21, and SR-28.*

***State Highway Impact Model**. State highways are analyzed using an incremental thickness model and data derived from the 2005 Washington State Pavement Management System. The incremental model is an abstract representation of the pavement rehabilitation process using overlays. It is based on the AASHTO rehabilitation/overlay method. The model determines the additional overlay thickness needed to accommodate the new truck traffic. The incremental method assumes that the structural number (SN) of a pavement is closely matched to existing truck traffic.*

***Estimated State Highway Impacts**. An additional $3.4 million in resurfacing cost will be incurred in future years if the CW line is abandoned. Of this total, $2.8 million will be needed for SR-21, portions of which have structural numbers of less than 2.0. This estimate is quite conservative because some segments of SR-21 with bituminous surfaces (i.e., BST pavements) may need reconstruction. The portion of SR-21 between mileposts 41 and 55.7 is of special concern. These BST sections have SN values ranging from 1.2 to 1.7. The base layers are untreated and relatively thin (e.g., 6 inches). If this portion of SR-21 has to be reconstructed, the incremental cost of state highways will increase from $3.4 million to $11.5 million.*

***County Road Impact Analysis**. The recent diversion of traffic from the CW line has increased truck trips on many county roads. At present, there are significant mismatches between structural numbers and truck traffic. In these cases, the incremental method may understate highway rebuilding costs. Thus, the SN required for existing and incremental traffic is computed directly from the pavement design equation. Although this approach identifies the increased structural numbers needed for impacted highways, it is not a pure incremental method—i.e., it does not distinguish between the costs attributable to the 2,150 carloads on the line and recently diverted traffic.*

***Estimated County Road Impacts**. Two sets of estimates are described in the report: (1) those prepared by Adams and Lincoln counties, and (2) those derived using the model described above. The model suggests that portions of Danekas,*

Hills, Monson, and Waukon Roads may need to be reconstructed, while the structural capacity of the remaining segments can be increased through resurfacing. The total cost of this solution is $21.7 million. This estimate is substantially lower than the total county estimate of $51.4 million for full reconstruction of impacted sections. Because the counties' estimates are based on field data and detailed engineering knowledge of soils and base materials, they have the greatest credence.

***Comprehensive vs. Incremental Impacts**. The $21.7 million estimate reflects the needs of both existing and incremental traffic. From a cost-responsibility perspective, these costs are traceable to traffic originated from CW stations. However, some of these costs may be incurred regardless of whether the additional 2,150 carloads are added to the highways. The higher county estimates consider all traffic (current and projected) and the preferred improvement option of reconstruction. There are some differences between the two sets of cost estimates because of route assumptions.*

***Data Limitations and Analysis Issues**. The cost estimates presented in this report are not purely incremental because they reflect traffic diversions from the CW line since 2000, as well as other grain truck traffic in the region. However, most of these impacts are attributable to past or projected traffic diversions from the line. The estimates are subject to several key assumptions and limitations: (1) The mix of commodities shipped from the line is unknown. It is assumed that all 2,150 cars are loaded with grain. (2) Inbound truck shipments to elevators are assumed to remain the same. The analysis focuses only on outbound movements from CW elevators. (3) Several roads in Spokane County are impacted by truck shipments from stations located at the eastern end of the line. However, these stations do not currently ship by rail. Therefore, their impacts are not analyzed. (4) Several BST segments of SR-21 may need reconstruction, which would greatly increase the projected cost of state highway improvements.*

***Conclusion**. When county road impacts are viewed from a comprehensive perspective which reflects both past and projected traffic diversions, the cost estimates range from $21.7 million to about $50 million. The higher county estimates reflect full reconstruction and consider traffic from elevators that are not currently shipping by rail, as well as other potential grain truck impacts. When the minimum projected state impacts of $3.4 million are added to the minimum county impacts, the predicted cost is $25.1 million.*

The results of these highway impacts are presented in Table 9. These costs represent resurfacing those segments of county and state highways which would be impacted by diverted truck flows. Collectively, Tollivers' estimated county road improvements needed as a result of losing the CW line total $21.7 million every 12-15 years. As indicated by Tolliver (and also Jerry Lenzi, WSDOT East Region Administrator who reviewed the

report), this represents a conservative estimate for county road impacts given that only 2,150 rail cars are considered, when the average annual number of rail cars shipped on the CW line over the last five years would be closer to 3,000. Lenzi also pointed out that while the design life of these pavements is between 15-20 years, the experience in Eastern Washington is closer to 12-15 years. Also, the county engineers from each of the counties impacted conducted a similar analysis and their collective estimate totaled $51.4 million but included slightly different assumptions on recently diverted traffic that is already occurring on the county roads, and also the route selected to access river ports.

Table 9: Cost of Resurfacing with Selective Reconstruction Improvements

County Highway	Reconstruction	Resurfacing	Total
Danekas Rd	$ 2,273,988	$ 704,000	$ 2,977,988
Harrington/Toyko Rd			
Hills Rd	$ 1,746,261		$ 1,746,261
Kiner Rd		$ 1,540,000	$ 1,540,000
Monson Rd	$ 3,305,500	$ 1,322,200	$ 4,627,700
Rocklyn Rd		$ 2,358,400	$ 2,358,400
Rosenoff Rd		$ 2,855,600	$ 2,855,600
Schoessler Rd		$ 156,200	$ 156,200
Waukon Rd	$ 2,557,500	$ 2,901,800	$ 5,459,300
Total County Road Impacts	**$ 9,883,249**	**$ 11,838,200**	**$ 21,721,449**
Total State Highway Impacts		**$ 3,400,000**	**$ 3,400,000**
Total County and State Highway Impacts			**$ 25,121,449**

Source: Adapted from Denver Tollivers' Report "Projected Pavement Impacts of CW Rail Line: Draft Report 2/25/2006.

Thus, the range of total highway impacts from CW line abandonment was found to be between $25.1 million and over $51.4 million, every 12-20 years as the roads life is used up under differing road conditions, identifying a significant benefit in avoided costs to the

state from maintaining this rail line. It should be noted that as these highways are improved, additional safety, efficiency and economic development benefits are created as a result of the highway improvements.

There are other benefits that were difficult to quantify under the time constraint of this study, but nonetheless do exist. These would include the following:

- Increased **energy consumption and environmental emissions** occur as wheat is diverted from the CW line and truck is used for longer distances. A recent study updating energy coefficients in the region for transportation (Trent and Casavant, Alternative Evaluations of a River Drawdown: Reassessing the Environmental Paradox, Journal of the Transportation Research Forum, Fall 2005), found the regional energy use by mode to be 278, 366 and 549 BTU's per ton-mile for rail, barge and truck movement, respectively. Thus energy consumed per ton mile as grain is moved by truck rather than rail would be increased almost 100%. Movements by barge rather than rail would also cause over a 30% increase in energy utilization and would require a much longer haul by truck, the most energy intensive of the modes. The energy increase would also cause a proportional increase in emissions of nitrous oxide, hydrocarbons, carbon dioxide, particulate matter and sulfur oxide, all elements affecting the environment. Thus energy and emissions savings occur with the continuance of the CW line.

- The shippers interviewed for this study indicated there would be savings in **shipper investments**, if the CW line is maintained, since they would not have to retrofit their houses to be more truck friendly and efficient. No quantitative estimates were available at the time of the study but all but one firm indicated some investment would be necessary.

- One benefit of maintaining the line, reflecting the **loss of competition** between the modes, is the extent that truck-barge rates to the river, at different locations, increase when the CW line is no longer in use. The extent of increase in barge

rates would be conditioned by the level of rates offered by the Ritzville facility, The amount of increase in truck rates, in reaction to the increased demand for truck services is difficult to determine but is a reality, based on the rate increases we have seen and the experience in other areas. Truck costs in the affected region increased from $1.40 per mile in 2002 to $1.80 a mile in late 2005, almost 30% in just truck rates in three years, with fuel prices being much of the cause, along with labor availability and increase in overall demand.

- A benefit that is even more difficult to quantify but few would disagree exists is the entire concept of "option demand" in **economic development** where, if the rail of some sort isn't available, the possibility of locating and developing firms and new industries in the region is hindered or doesn't even exist. A known fact is that the best job created in an area is the saved jobs that are already there. The Geiger area and the jobs on the CW line fall into the latter part. Availability of a competitive and complementary transportation system affords those public benefits.

SUMMARY, CONCLUSIONS AND CONSIDERATIONS

This CW line market assessment has revealed a dynamic and uncertain market with a multitude of competing forces and decision makers/stakeholders in the market having different options. For example, BNSF's approach to rates and railcar availability may be the overriding ultimate market force. (For that reason, the State is encouraged to use its negotiating leverage for all partnerships with BNSF in all parts of the state, not just this short line. The outcome of those deliberations affects the dynamics of this market.) Among other issues that are certainly not known for sure, but may be critical, are the level of maintenance chosen for the line, the timing and magnitude of the track rehabilitation, the level of grain traffic committed and achieved on the line, the amount of new "economic development" traffic reached (Geiger spur, Rabanco, bio-diesel, feed mills, forest products, etc.), the continued progressive marketing by the Ritzville facility management, energy impacts on operating costs of all modes, etc. These forces make this marketing assessment and accompanying viability evaluation and any investment recommendations also uncertain and susceptible to the business decisions by firms and institutions in the market. The lack of certainty makes consultant evaluations and state policy recommendations necessary but vulnerable.

The authors find the **Most Probable Scenario** in the future to be the following. The CW line is marginally profitable or unprofitable depending on shifting market conditions and shipper commitment. If high maintenance investments per mile are necessary to operate at the cost efficient 25 mph, and shipper commitment to the line is low or remains at recent levels, and existing carrier costs (irrespective of who the carrier is) are incurred, a shortfall loss will occur and continued ownership (State, port, or whomever) will require an annual operating cost investment. This investment would probably be

around $200,000-$400,000 if high maintenance is required and zero to $100,000 if only medium levels of maintenance are necessary.

The **Best Possible Scenario** would occur when grain volumes increase over 3,000 cars as a result of renewed shipper commitment to the CW line (due to Scoot train efficiencies, desire to maintain competitive transportation market, search for marketing flexibility, new firms and traffic), while maintenance is only required at the medium level (still twice the current levels) and operating costs are decreased (due to new ownership/operating management, increased volume, earlier rehabilitation investment, state Grain Train cars, etc.) Under this scenario, revenues will cover both fixed and operating costs, including any return on investment desired by the operators or owners. No additional annual investment would be required by the state.

The **Worst Possible Scenario** would arise when increasing traffic volumes fail to materialize (for whatever reason), no new "economic development" traffic is realized, a high maintenance level is required (for whatever reason), increase in carrier costs per car caused by low traffic levels occur, a new 110 car load facility is built in competition with CW line movements, and BNSF rate differentials make the Ritzville facility even more attractive. In this case annual investments, if the line is to be kept operational, might be as high as $1,000,000 per year.

Public and Private Benefits, both quantifiable and potential, to consider in this decision are substantial. No benefit/cost analysis was requested for this study but a positive benefit/cost ratio is probable. Road damage and usage costs avoided by maintaining the CW line are estimated to be from $3.4 million to $11.5 million for state highways every 15-20 years. For the same period of time county roads, because of their lower

level of construction, and the routes chosen by the trucks, are estimated to incur road expenditures of $21.7 million to over $50 million, in traffic related to the CW line. The range of total highway impacts from CW line abandonment is between $25.7 million and over $51.4 million, (or more, if extra reconstruction on certain county roads is necessary) identifying a significant benefit to the state and counties from maintaining the CW line.

Other Benefits Exist that is associated with having the competitive and complementary functions of the CW line, benefits such as the lower costs available to shippers as competition drives prices charged down to long term variable costs, improving efficiency in the overall system. The CW line also offers shippers flexibility in marketing their products, increasing the modes, routes and marketing/storage alternatives, including using the secondary freight market to guarantee car availability or revenue enhancement in an up market. The current shippers believe that rate increases by truck-barge or truck-Ritzville would be constrained by the continued availability of the CW line.

Energy consumption and emissions production would be increased if the line is no longer available. The energy efficiency of rail is 30% higher than barge and about 100% better than truck. Emissions production follows proportionately the level of energy (fuel) used in transporting the products out of and into the region.

Actual Operating Costs for the existing or future railroad operations must be determined. Tyee's analysis and comments reveals the uncertainty felt by the analyst, and agreed with by these authors, on the completeness and accuracy of the original and revised costs and traffic levels offered by Watco. Negotiations with the current or new operator require increased transparency of financial information above that currently

available. Alternative and potential rail managers/firms can aid in that operational information discovery.

Actual Maintenance and Marketing Efforts are critical to the long term viability of the CW line. Any purchase or operating agreement should include specific detail on responsibilities, auditing and enforcement of the maintenance commitments as well as traffic and cost experiences, otherwise the value of the State's investment deteriorates and the viability of the line is threatened. The marketing effort should also be specified in detail in any contract, marketing effort that indicates a reaching out for both past traffic and new potential traffic, both agricultural and "economic development". Grain shippers should be aided in seeing the potential tradeoff between short term "cents" versus long term "dollars" if the CW line is eliminated.

Federal/Regional Partnerships may be possible in supporting the continued operation of the CW line. The security and electrical power benefits identified as possible during the short time of this study suggest that this line reasonably might be a candidate for Federal/Regional partnership with the State.

APPENDIX A

EVENTS CREATING CURRENT SITUATION

History

The PCC shortline railroad is comprised of three lines, the first of which, the CW line, is the focus of this Phase I report. The decision currently faced by the State and the shippers on this line reflects the condition of the three lines as evaluated prior to the State deciding to purchase the lines in 2004. The total PCC shortline railroad provides the majority of the local rail service in Eastern Washington. It is the state's largest shortline and is the second longest rail line in the state at 375 miles. The line carries about 20 percent of the grain grown in Washington, serves industries employing more than 1,200 people, and moves cargoes worth about $160 million each year, in 2003.

The PCC, owned by Watco, was formed in the 1990s from UP and BNSF branch lines that were slated for abandonment. The Class 1 carriers had not been maintaining these lines, relying on deferred maintenance to generate some net revenue from the lines. Thus, a considerable amount of "catch-up" maintenance existed to bring the lines up to operational and economic viability.

Analysis by the WSDOT indicated that the operating expenses were covered by existing revenue but that revenue could not cover the required maintenance, past and current, resulting in some lines requiring rehabilitation, rather than just maintenance. The operating company, Watco, did not want to make those investments, given their existing profit and loss situation, and notified the WSDOT that they would be initiating formal abandonment unless some form of public assistance or public/private partnering was achieved.

WSDOT was directed by RCW 47.46 to assist rail lines that provided benefits to the state and local jurisdictions, such as avoided highway cost and economic development potential. Formal reviews and benefit-cost determinations must be completed before freight rail assistance funds can be expended. WSDOT did consult with shippers and other interested parties and preformed an extensive benefit/cost analysis.

Based on that due diligence work, the legislature in 2003 provided a Transportation Funding Package to purchase the lines, dividing it between the 2003-05 and the 2005-07 bienniums. The purchase price for all the lines of the PCC was $7.998 million. The P & L and the PV Hooper lines were purchased in November of 2004 for $6.486 million.

Additionally, WSDOT has prepared and received funding for an overall Track Rehabilitation Plan to address track condition and maintenance issues on the PCC to some degree. The State has approved $21,089,000 for PCC Track Rehabilitation, with $8,544,450 approved specifically for the CW line. The expected allocation of the funds over time for the CW line was $322,000 in 2005-07, $5,663,000 in 2007-09 and $2,559,450 for 2009-2010. It is expected that the funding in the first two biennia would be adequate to achieve Class 2 level of service, at 25 mph speeds.

Due Diligence Studies

Various studies and information sources were required and conducted to support the benefit/cost analysis supporting any state decision. These studies detail the situation at that time, explain the past decision and inform the debate that is currently ongoing.

Watco Companies, Inc.

Presentations to shippers, state government and other interested stakeholders by Watco included the most recent data available, based on the railroad's presentation of their experience in 2002. The information provided emphasized Watco's perspective on the individual line segments, the traffic hauled, the costs incurred and the revenue generated. Specific line segments were presented by Watco as the Coulee City to Cheney, the Marshall to Moscow, the Pullman to Hooper and the Thornton to Winona segments.

Data from the PCC showed a positive cash flow of revenue over operating costs for all of the line segments except for the Pullman to Hooper branch. Operating costs were mainly in the categories of track repair, weed control, locomotive leases, repair and fuel, labor, car hire and other railroad expenses. Total net profit for the system was an annual $642,963, even after a $147,047 loss on the Pullman to Hooper line. Total system operating costs were presented as $2,562,235 and revenues were $3,205,198. A total of 7,308 carloads were handled on these lines for the various shippers in 2002. What is noticeable is that other revenue of $550,440, or an additional 21 percent, from leases, etc. was added to the carload revenue of $2,654,758 to generate the total annual revenue.

Forty two shippers were served on the entire line, ranging from 3 on the Pullman to Hooper line to 25 on the Marshall to Moscow line. All lines have 90 lb. rail except for the Thornton to Winona line, comprised of 75 lb. rail. The Thornton to Winona line is also notable because it carried, on average for the past three years at that time, 547 shuttle loads of grain to the river.

The above figures, however, do not include the track preservation costs that should have been invested to keep the lines from deteriorating. Watco suggested another $1,188,000 of track repair and maintenance was necessary to keep the line at its then current level of service. These funds had not been expended because, from Watco's perspective, revenue was not high enough to warrant the investment. Further it was estimated that when earnings before interest and taxes and depreciation allowance (EBITDA) at 30 percent were considered, another $1,607,244 would be required. When these ownership and depreciation costs are added to the other costs, Watco estimated an annual loss of $2,152,281 for 2002.

Watco argued there are legitimate concerns of continued deterioration of the track due to the insufficient revenue. Further, the continued economic instability of the line might cause current customers to look for alternative ways to move their product to market. Watco also cited increased costs from derailments and insurance rates, again due to the lack of funding to maintain the railroad at a safe Class II level of operation (25 mph).

Tolliver Study

WSDOT funded several substantial and comprehensive studies dealing with different parts of the overall concern of the loss of short-line/branch lines in the Washington. One of these, by Dr. Denver Tolliver, dealt directly with the viability of short-line railroads in the Palouse and Blue Mountain regions of Washington. The purpose of that report was to provide an independent analysis of the viability of the rail-lines. The rail-lines were analyzed as if they were operated under contract by a hypothetical carrier as a private entity. This operator could have been the PCC or another short-line railroad. Tolliver derived independent estimates of operating costs, track net liquidation values and

normalized maintenance costs from detailed field data, track charts and engineering models.

In contrast to the presentations from Watco, the set of lines or subsystems in the PCC networks that were analyzed included four lines: Cheney to Coulee City, Marshall to Pullman, the Blue Mountain Railroad North, and the Blue Mountain Railroad South. The first three lines cover the four lines presented by Watco; the Blue Mountain Railroad South extends form the UP mainline at Wallula Junction to Walla Walla, where it connects with another line running from Dayton, Washington to Weston, Oregon.

This technical study used the Uniform Railroad Costing System (URCS), applied on a regional basis, to estimate operating costs. Normalized track maintenance costs were estimated using detailed data from extensive field studies conducted in 1998 and 1999 by Wilbur Smith Associates and track factors published by the American Railway Engineering and Maintenance of Way Association (AREMA). Track ownership costs were estimated by applying the railroad cost of capital to the net liquidation value (NLV) of each line (the amount invested by mile times the opportunity return in the market).

The overall conclusion of this study was that, based on current revenue divisions (split of the tariff between the shortline railroad and the BNSF and/or UP) the lines are projected to incur losses, if operated as private entities, when normalized track maintenance and track ownership costs are considered. Relief of the ownership costs of over $100,000 per year and lower costs from rehabilitated lines could, however, make the lines viable for an operator. Tolliver further stated that the PCC rail lines are an important part of the Washington state transportation system, serving important grain producing regions and providing service to food and forest products industries.

The lines were examined on a per car basis, using the existing level of traffic in 2000. For the Cheney to Coulee City line, the focus of this Phase I report, the on-branch train, car and clerical costs were $244 per car. Track maintenance cost was $231 and track ownership cost was $53 per cars, which summed to $528 per carload. If the on-branch car-day cost was absorbed by the BNSF, as was done at that time, then the cost dropped to $453 per car. In comparison, the current revenue division was slightly above $400 per car, thus making it marginally unprofitable/nonviable, at full costs.

In summary for the total railroad, Tolliver's analysis of a "hypothetical model of a railroad" suggested that, similar to the Watco presentations, the existing revenue will cover the private operating costs, but not the normalized maintenance and private ownership costs. He further stated "If these lines cannot be operated profitably as a private entity the state may be faced with a difficult choice-acquire the lines or let them be abandoned." Several in-between options dealing with rehabilitation of portions of the network for the private operator, with the attendant decrease in normalized maintenance costs, were offered.

Railroad Industries Incorporated Marketing Study

In their continuing effort to learn as much as possible about the real financial and economic parameters surrounding the short line railroad situation in eastern Washington, the Washington State Department of Transportation commissioned a marketing, economic and operational analysis of this short-line railroad system in eastern Washington. The consultant, Railroad Industries Incorporated, found that three of the four lines provide a significant benefit to the local communities, shippers and the

State. It further found that there was significant volume of traffic that could utilize rail if the “appropriate marketing plans, rates and rail services” were in place.

The four lines had around 58 million bushels of grain storage, or about 38 percent of the total capacity in the state, located on the lines. The study found that, although traffic on the lines has been declining, the decline did not need to continue. Railroad Industries Incorporated found that, with the appropriate efforts, the traffic on three of the four lines could increase to the level that it would cover all costs and produce a profit in the long run.

The four lines evaluated by Railroad Industries Incorporated were the Coulee City Line, the Palouse River Line, the Blue Mountain North line and the Blue Mountain South Line, similar to the Tolliver study. Using the concept of “Going Concern Value”, Railroad Industries Incorporated evaluated the line segment on an existing base case, the potential base case (including volume projections from shipper interviews and new opportunities) and a break-even case. For the Coulee City line a current Going Concern Value of between $1.6 and $1.8 million was determined, meaning the net value of the return of revenue over costs. Assuming new traffic levels were achieved from an aggressive marketing plan, the value increases to $2.2 to $2.6 million. Results of the break-even case indicated that this railroad segment could remain viable with either a 25 percent rate reduction or a 22 percent carload reduction, but not both.

This study gave detailed analysis on the existing revenue/cost ratio, potential traffic, and suggestions for operational improvements for whichever railroad operated these lines. It also provided some useful detail on the competitive structure among transportation

modes and production facilities, based on interviews with all of the major shippers on the lines.

In summary, all of these major studies and information sets suggested that the viability of the PCC was in question, but that some revenue over operating costs could be realized. The data relied upon by several of the studies were several years old and the analysis doesn't directly correspond, due to differing line segments. Questions of the revenue, costs, apportionment of costs, net liquidation value and future traffic, track ownership and loan status were not fully considered in these analyses.

Net Liquidation Value (NLV)

Estimating the Net Liquidation Value (NLV) was critical in this circumstance since Watco was suggesting that they were willing to sell the lines for that value. NLV is a measure of the current value of a line based on the market prices of individual assets such as rails, ties and other track material. NLV accounts for the removal, restoration and transportation costs to the location where the asset will be used or scrapped. It does not include land costs.

The history of estimates of NLV of these lines was long. Initially, based on conversations between Watco and WSDOT, an estimate of $12 million was used, both in early negotiations and as a basis for the funding request in the 2002 Washington State Referendum 51. This value dropped substantially as the discussion in the region became broader and with more specific analyses.

The Tolliver Study used the values from an analysis done by Wilbur Smith Associates, based on detailed field surveys undertaken in 1998 and 1999. Excluding the Walla

Walla to Dayton branch (Blue Mountain South), the NLV of track operated by the PCC in Washington was $9.86 million. However, when the Zangar Jct. To Walla Walla was excluded from the analysis, since it is owned by the UP, the NLV estimate dropped to about $8.418 in the Tolliver estimation.

The presentations by Watco to a meeting of then Commissioner Maher's Transportation and Economic Development Meeting also included estimates of the NLV. Estimates of NLV were: Coulee City to Cheney ($1,794,110), Marshall to Moscow ($3,644,512), Pullman to Hooper ($2,274,316), and Thornton to Winona ($705,266), for a total of $8.418 million.

Again, the NLV value is a moving target. It was known that the market value for used rail and ties had softened in recent years (subsequently, the market for steel has given rise to estimates that may be triple the earlier conditions). Further, a discussion with a consultant, Michael Sussman, hired by the WSDOT to do "due diligence" on determining the actual revenues, costs and net liquation value, suggested, very preliminarily, that the current value could be less than previous estimates. However, even more recent reviews at that time suggested the market for used ties and rail had been very erratic, with recent short-line repair needs in the nation raising the value of some kinds of relays and rail.

Recognizing the importance of this NLV estimate, the Rail Office of WSDOT conducted several activities to determine the relevant range of estimates. R. L. Banks produced an initial overall estimate and another consultant, Dave Cahill, provided a specific estimate for the lines under consideration. Current estimates at that time seemed to fall at or near the $8.4 million commonly discussed, though R. L. Banks estimate is higher.

That value served as another data point as negotiations among the State and Watco proceeded. The resultant purchase price, and legislative authorization of funding, of $7.998 million reflects those studies.

Ownership of Right of Way

Initial discussions with Watco and WSDOT assumed that Watco owned the right of way and that any purchase by the state would include this component, including the value as a telecommunications corridor. However, work by the Washington State Attorney General, WSDOT, and subsequent concurrence by Watco revealed that the corridor rights for telecommunications and other utilities were retained by the BNSF and the UPRR.

Achieving Viability

The above analyses did indicate that the lines were, in most cases, capable or potentially capable of covering the current operating costs. All of the studies suggested that most lines did not cover ownership, maintenance and rehabilitation investments under then current traffic levels and funding agreements.

Railroad Industries Incorporated found an aggressive marketing plan with some rehabilitation investment may be successful in achieving viability in the long run. Tolliver suggested that the state may be faced with a difficult choice, acquire the lines or let them be abandoned. Current expenditures at that time on the lines appeared to be only half of what normalized maintenance should have been, $4,000 per mile of $7,900 per mile on average for the different lines. Public rehabilitation would lower private ownership costs while lowering normalized maintenance costs.

Watco, in its presentations to the Maher Transportation and Economic Development Group, was more direct. Initially, it estimated that sale of the lines to a public entity ($8.418 million) resizing the locomotive fleet, improving the track infrastructure, and growing the revenue on the line were solutions that would bring continued viability. In a second meeting of the Group, Watco added $2,000,000 for crossing improvements (closing 60 crossing and replacing 140 crossings with concrete), seeking a change in the rate division between the Class I Railroads and the PCC, and what they referred to as "public Interest" as means to viability. The latter referred to a request for an additional $250,000 per year for maintenance from the state, and $80,000 per year in property tax reduction. Watco stated, "These adjustments allow the PCC Railroad to achieve long-term operational success." It should be noted that no specific information on many of these issues was offered on a segment by segment basis, only very general estimates.

APPENDIX B

SHIPPERS ON THE PALOUSE RIVER AND COULEE CITY RAILROAD

Coulee City to Cheney

Almira Farmers

Anderson Hay

Cash Hardware

Central Washington Grain

Davenport Union

Issac Brothers

McKay Seed

Odessa Union

Reardan Grain Growers

Western Farms

APPENDIX C

Financial Analysis by Tyee Partners LLC.

Palouse River and Coulee City Railroad

CW Branch

(Coulee City to Cheney Route)

Revised on February 17, 2006

Based on Actual results for 2005 - Source WATCO

	WATCO Actuals				Break Even Levels at Decreasing Track Maintenance Spending Levels								Based on Projected Car Load Volumes and Full Maintenance Spending				
		Rail Car	Units	$ Per Load	Per Unit $	B/E Now	B/E @ $8000	B/E @ $7,000	B/E @ $6,000	B/E @ $5,000	B/E @ $4,000	B/E @ $3,000	Per Unit $				
	Dollars	Loads				1,965	4,812	4,735	4,640	4,521	4,369	4,163		4,000	3,500	3,000	2,500
Revenue	652,256	1,561		417.84	417.84	821,143	2,010,578	1,978,396	1,938,867	1,889,280	1,825,642	1,739,468	417.84	1,671,380	1,462,457	1,253,535	1,044,612
Operating Costs																	
Variable:																	
Train Operations	146,123	1,561		93.61	46.80	91,979	225,212						46.80	187,217	163,815	140,413	117,011
Locomotive	100,530	1,561	4	64.40	32.20	63,280	154,942						32.20	128,802	112,702	96,602	80,501
Fuel	116,416	1,561		74.58	37.29	73,280	179,426						37.29	149,156	130,511	111,867	93,222
Safety	35,476	1,561		22.73	22.73	44,662	109,355						22.73	90,906	79,543	68,179	56,816
Other Variables (Maintenance, Vehicles, Fuel)	106,746	1,561		68.38	68.38	134,385	329,044						68.38	273,532	239,341	205,149	170,958
Total Variable Operating Expenses	505,291	1,561		323.70	207.40	407,586	997,979	1,073,796	1,142,268	1,200,680	1,245,043	1,266,869	207.40	829,613	725,911	622,210	518,508
Variable Cost per Car Load (See Assumptions)						207.40	207.40	226.79	246.17	265.55	284.96	304.32		207.40	207.40	207.40	207.40
Fixed:																	
Track	264,958					264,958	864,000	756,000	648,000	540,000	432,000	324,000		864,000	864,000	864,000	864,000
Rail Car (Leases)	15,642					15,642	15,642	15,642	15,642	15,642	15,642	15,642		15,642	15,642	15,642	15,642
Fixed (Insurance, Property Tax)	64,470					64,470	64,470	64,470	64,470	64,470	64,470	64,470		64,470	64,470	64,470	64,470
Total Fixed Operating Expenses	345,070					345,070	944,112	836,112	728,112	620,112	512,112	404,112		944,112	944,112	944,112	944,112
						-								-	-	-	-
Total Operating Expenses	850,361					752,656	1,942,091	1,909,908	1,870,380	1,820,792	1,757,155	1,670,981		1,773,725	1,670,023	1,566,322	1,462,620
Operating Profit (Loss)	(198,105)					68,487	68,487	68,487	68,487	68,487	68,487	68,487		(102,345)	(207,566)	(312,787)	(418,008)
Corporate Allocation	68,487					68,487	68,487	68,487	68,487	68,487	68,487	68,487		68,487	68,487	68,487	68,487
WATCO Profit (Loss)	(266,592)					(0)	0	0	0	0	0	(0)		(170,832)	(276,053)	(381,274)	(486,495)
Track Maintenance Cost Per Mile																	
Track Length	108					108	108	108	108	108	108	108		108	108	108	108
Track Maintenance per mile	2,453					2,453	8,000	7,000	6,000	5,000	4,000	3,000		8,000	8,000	8,000	8,000

Shaded areas are not caluculated by for each line item.

It is assumed the total Variable Cost prr Car Load will increase as track maintenance spending and conditions decrease

APPENDIX D

Potential Highway Impacts of the Central Washington Rail Line

Draft Report prepared for:
The Washington State Department of Transportation

By:
Denver Tolliver and HDR Engineering, Inc.

February 10, 2006

Table of Contents

Introduction

The purpose of this study is to estimate the highway impacts resulting from the potential abandonment of the Central Washington (CW) rail line. The CW line extends from Cheney to Coulee City. The Cheney-to-Coulee City line is part of the Palouse River and Coulee City Railroad (PCC). Loss of rail service would have serious implications for shippers on the line, as well as for the Washington State Department of Transportation (WSDOT) and county governments in the region.

Much of the traffic originated from the CW line moves to Pacific ports by rail. If the line is abandoned, traffic that is currently moving by rail will be trucked to barge transfer facilities located on the Columbia and Snake rivers, or to the shuttle-train terminal in Ritzville. With the exception of US-395, most of the north-south highways in eastern Washington are minor arterials or collectors. Moreover, many of the routes from CW stations to Ritzville include county roads that have not experienced substantial truck traffic in the past.

Background

The CW line was sold to PCC by the BNSF Railway in 1996. The line is approximately 109 miles long. It connects to the Spokane-Pasco mainline at Cheney. From Cheney, the CW line runs through Medical Lake and Hite on its way to Reardon. From Reardon westward, the line parallels US-2, running through Davenport, Creston, Wilbur, and Hartline before terminating in Coulee City.

In 1999, approximately 4,300 carloads were originated from stations on the CW line. Another 3,971 carloads were originated in 2000. In comparison, only 2,150 carloads were originated in 2005. With the exception of a few carloads of farm implements, grain is the only commodity that is regularly handled on the line. Much of the grain traffic originates from Wilbur, Almira, Hartline, and Coulee City (Table 1)—stations that are located on the western segment of the line. Apparently, much of the traffic originated during 1999 and 2000 has shifted to trucks, and is already moving over highways in the region.

Organization of Report

Several steps are involved in estimating highway impacts. The report is organized in accordance with these primary steps.

- The identification of post-abandonment shipping patterns.
- The identification of truck routes to post-abandonment destinations.
- The development of highway and baseline traffic data for individual roadway segments.

- The estimation of incremental equivalent single-axle loads (ESALs) for impacted highway segments.
- The estimation of increased highway structural numbers and investment costs attributable to incremental traffic.

Table 1. Estimated Carloads of Traffic Originated from CW Rail Line in 2005	
Station	**Carloads**
Coulee City	548
Hartline	423
Almira	394
Wilbur	343
Creston	233
Davenport	149
Reardan	60

Post-Abandonment Trucking Patterns

The highway-related impacts of traffic diversions from the Central Washington line will depend upon transshipment choices and routes. Without rail service, shippers will have three main options: (1) truck directly to Pacific ports, (2) truck to Tri Cities or Windust, or (3) transship via the Templin Terminal at Ritzville. The trip distance from Coulee City to Portland is about 350 miles. Thus, it is unlikely that grain will move directly by truck to final market. Instead, it will be trucked to Ritzville or a barge transfer facility.

In this section of the report, the cost of transshipping grain via river ports is compared to the cost of transshipping grain via Ritzville. This comparison is necessary to identify impacted highway routes.

Railroad Rate Relationships

Rates from stations located on the CW line to Portland are shown in Table 2. When wheat is shipped in 286,000-pound cars, the 50-car rates vary from $1,486 to $1,567 per car. In comparison, the shuttle-train rate from Ritzville to Portland is $1,105 per car. Moreover, Ritzville may be eligible for an origin-destination efficiency allowance of at least $100 per car. Thus, the rate differences shown in Table 2 may be understated.

The base tariff rates do not consider fuel surcharges. As of February 1, the BNSF mileage-based fuel surcharge is 30 cents per mile. The effective rates with fuel surcharges are shown in Table 3.

Table 2. Rail Rates for Wheat Shipments from CW Stations to Portland in 286,000-lb Railcars				
Station	Rail Distance to Portland	Rate per Car		
		1-25 Cars	26-109 Cars	110-120 Cars
Almira	451	$1,605	$1,567	
Coulee City	472	$1,605	$1,567	
Creston	427	$1,567	$1,529	
Davenport	405	$1,523	$1,486	
Hartline	461	$1,605	$1,567	
Reardan	391	$1,523	$1,486	
Wilbur	437	$1,605	$1,567	
Ritzville	**315**	**$1,251**	**$1,214**	**$1,105**
BNSF Tariff Item 43590				

Table 3. Effective Rail Rates for Wheat Shipments Including Fuel Surcharges				
Station	Rail Distance to Portland	Fuel Surcharge	Effective Multi-Car Rate	Effective Shuttle Rate
Almira	451	$135	$1,702	
Coulee City	472	$142	$1,709	
Creston	427	$128	$1,657	
Davenport	405	$122	$1,608	
Hartline	461	$138	$1,705	
Reardan	391	$117	$1,603	
Wilbur	437	$131	$1,698	
Ritzville	**315**	**$95**		**$1,200**

Table 4 shows rate differences per car between CW stations and Ritzville. The differences range from $404 to $509 per carload, without considering origin-destination efficiency allowances. If the shuttle loader and receiver load and unload the train within 15 hours, each receives a $100 per car incentive. When these origin-destination efficiency allowances are considered, the effective rate differences between CW elevators and the Templin Terminal range from $604 to $709 per carload.

Table 4. Summary of Rate Differences per Car between CW Stations and Ritzville		
Station	**Rate Difference per Car**	**Percent Difference**
Almira	$503	46%
Coulee City	$509	46%
Creston	$458	41%
Davenport	$408	37%
Hartline	$506	46%
Reardan	$404	37%
Wilbur	$499	45%

Barge Rates

The base barge rate from Tri Cities to Portland or Kalama is $6.05 per ton (Table 5). The barge fuel surcharge is applied to the current rate, based on a benchmark price established several years ago. Item 105 of the tariff says: If the average OPIS price is at least 5 cents per gallon higher than the base price of 90 cents per gallon, the transportation rates will be increased by 1.00% for each 5 cent change in the average fuel price above the base price for the immediately following month. Based on this language, the base rate has been increased by 16 percent to account for fuel surcharges. This results in an effective rate of $7.02 per ton.

Table 5. Barge Rate per Ton from Tri Cities to Portland	
December OPIS Average Fuel Price	$1.74
Benchmark Fuel Price	$0.90
Price Difference	$0.84
5 Cent Increments	16
Base Tri Cities Rate	$6.05
Adjusted Rate	$7.02
Source: Tidewater Barge Lines Inc. Rate Schedule No. 4-B	

The adjusted rates for Windust, Central Ferry, and Almota are $7.64, $8.60, and $8.64 per ton, respectively.

Cost Comparison: Coulee City

According to shippers, the cost of transporting wheat in a Rocky Mountain Double truck is approximately $1.80 per mile. Therefore, as shown in Table 6, the total estimated cost to ship wheat from Coulee City to Portland via Ritzville

is $21.48 per ton, or 64 cents per bushel.[3] This estimate includes a 5 cent per bushel transfer cost at Ritzville.

Table 6. Cost for a Wheat Shipment from Coulee City to Portland Via Ritzville	
Truck Cost per Mile	$1.80
Trip Distance	90
Cost per Round Trip	$324
Net Tons per Truck	36
Truck Cost per Ton	$9.00
Transfer Cost per Ton	$1.67
Rail Rate per Car	$1,200
Rail Rate per Ton	$10.81
Total Shipment Cost per Ton	$ 21.48

As noted earlier, BNSF has an Origin Efficiency Program (OEP) that pays a $100 per car incentive for 15-hour loading, and a Destination Efficiency Program (DEP) that pays a $100 per car incentive for 15-hour unloading. If the OEP incentive is realized, the total transportation cost via Ritzville drops to 62 cents per bushel. If both the OEP and DEP payments are earned, total transportation cost via Ritzville drops to 59 cents per bushel.

As shown in Table 7, the total estimated cost per ton to ship wheat from Coulee City to Portland via Tri Cities is $20.29, or 61 cents per bushel. In this comparison, Coulee City shippers favor the Ritzville option when the OEP and DEP payments are reflected in the price. Otherwise, Coulee City shippers may be indifferent between Ritzville and truck-barge prices. However, the longer trip time to Pasco may create an impedance that is not reflected in the linear truck cost per mile.

Table 7. Cost for a Wheat Shipment from Coulee City to Portland Via Tri Cities	
Truck Cost per Mile	$1.80
Trip Distance	116
Cost per Round Trip	$418
Net Tons per Truck	36
Truck Cost per Ton	$11.60
Transfer Cost per Ton	$1.67
Barge Rate: Pasco-Portland	$7.02
Shipment Cost per Ton	$20.29
Shipment Cost per Bu	$0.61

[3] The comparisons presented in this section of the report should hold true for 268,000-lb and 286,000-lb railcars, since the rates per ton are essentially the same for both cars.

Cost Comparisons: All Stations

Table 8 compares river and Ritzville transshipment options for the stations shown in Table 1. This comparison does not consider shuttle-train OEP and DEP incentives, which may be reflected in the Ritzville price. Like the previous comparison, this one assumes that the Ritzville price is a function of the shuttle-train rate and handling cost.

Table 8. Comparison of Transshipment Costs via Ritzville and River Ports Without Considering Shuttle-Train Efficiency Incentives

Station	Cost per Bushel ($)	
	Ritzville	River Port
Almira	0.58	0.58
Coulee City	0.64	0.61
Creston	0.55	0.61
Davenport	0.51	0.56
Hartline	0.60	0.61
Reardan	0.56	0.61
Wilbur	0.58	0.58

With the exception of Coulee City, the closest river port is Windust. Without the shuttle-train incentives, shippers at Almira and Wilbur are indifferent between Ritzville and the river. However, shippers at Reardan, Davenport, and Creston clearly prefer Ritzville.

Table 9 compares river and Ritzville transshipment options for CW stations under the assumption that shuttle-train efficiency payments are reflected in the price relationships. Under these assumptions, the Templin Terminal offers a clear advantage for most elevators, with the possible exception of Coulee City.

Table 9. Comparison of Transshipment Costs via Ritzville and River Ports When Shuttle-Train Efficiency Incentives are Considered

Station	Cost per Bushel ($)	
	Ritzville	River Port
Almira	0.53	0.58
Coulee City	0.59	0.61
Creston	0.49	0.61
Davenport	0.45	0.56
Hartline	0.55	0.61
Reardan	0.51	0.61
Wilbur	0.53	0.58

The 2 cent-per-bushel difference shown in Table 9 may provide sufficient incentive for Coulee City elevator managers to transship via Ritzville. However,

many variables can affect an elevator's post-abandonment shipping decisions including service and institutional factors, such as joint ownership or financial integration of elevator and port facilities. Another factor is the ability of elevators to maintain independent marketing channels. Nevertheless, it is in the long-term financial interests of the Templin Terminal and BNSF Railway to increase the shuttle-train output of this facility. Therefore, price competition may result in higher bid prices at the Templin Terminal in an effort to capture additional grain traffic. Since the Templin Terminal has only 762,000 bushels of storage capacity, it may welcome arrangements with CW elevators.[4] Under such arrangements, wheat would be acquired and stored initially at CW elevators and subsequently reshipped to the Templin Terminal to load shuttle trains.

When all things are considered, the most likely post-abandonment scenario is transshipment via Ritzville. This is certainly true for stations other than Coulee City. The truck routes from Coulee City to Ritzville and Pasco follow SR-17 for the first part of the trip. Thus, the assumption of a post-abandonment destination for Coulee City is not a critical one. Most of the projected highway impacts are attributable to grain movements from Hartline, Almira, Wilbur, and Creston. These movements intensively utilize county and collector roads.

Impacted Highway Routes

The highway routes from CW stations to Ritzville are summarized in Table 10. These routes were derived using GIS routing tools, as well as information provided by county engineers who are familiar with truck routes. The routes reflect the shortest distance via main paved county roads and state highways, irrespective of highway functional class or speed limit.

In some cases, alternative routes are only slightly longer than the ones shown in Table 10. Thus, different trip patterns are possible. Moreover, additional road segments may be impacted by direct deliveries from farms to the Templin Terminal. These impacts are beyond the scope of this analysis.

[4] Each 110-car shuttle train requires 407,000 bushels of wheat. In effect, the Templin Terminal has storage capacity for only 1⅔ trains. In order to cyclically load shuttle trains, the terminal must draw wheat from on-farm storage or nearby elevators. Thus, after abandonment elevators located on the CW line and the Templin Terminal may find it mutually beneficial to development agreements for the efficient distribution of grain in the region.

Table 10. Highway Routes between CW Stations and Ritzville	
Origin	**Highway Segments in Route**
Coulee City	US-2 to SR-17
	SR-17 to I-90 (Exit 179)
	I-90 to Exit 220
	Danekas Rd to Ritzville City Limit
Hartline	US-2 to Kiner Rd
	Kiner Rd to Monson Rd
	Monson Rd to SR-21
	SR-21 to Rosenoff Rd
	Rosenoff Rd to Ritzville City Limits
Almira	US-2 to Kiner Rd
	Kiner Rd to Monson Rd
	Monson Rd to SR-21
	SR-21 to Rosenoff Rd
	Rosenoff Rd to Ritzville City Limits
Wilbur	US-2 to SR-21
	SR-21 to Rosenoff Rd
	Rosenoff Rd to Ritzville City Limits
Creston	US-2 to Rocklyn Rd
	Rocklyn Rd to Coffeepot Rd
	Coffeepot Rd to Harrington/Tokio Rd
	Harrington/Tokio Rd to Hills Rd
	Hills Rd to Danekas Rd
	Danekas Rd to Ritzville City Limits
Davenport	SR-29 to Coffeepot Rd
	Coffeepot Rd to Harrington/Tokio Rd
	Harrington/Tokio Rd to Hills Rd
	Hills Rd to Danekas Rd
	Danekas Rd to Ritzville City Limits
Reardan	US-2 to Waukon Rd
	Waukon Rd to SR-231
	SR-213 to SR-23
	SR-23 to I-90
	I-90 to Schoessler Rd Exit 226
	Schoessler Rd to Danekas Rd
	Danekas Rd to Ritzville City Limits

In Table 10, state routes are denoted by the prefix SR, while U.S. and Interstate highways are denoted by the prefixes US and I, respectively. All other highways are county roads.

Highway Data

State Highways

Data for state highways have been derived from the 2005 Washington State Pavement Management System (WSPMS). The WSPMS includes the following key information:

- Highway type and geometry
- Pavement/surface type
- The type, thickness, and age of pavement layers
- Average annual daily traffic and percent trucks
- Annual ESALs
- Future year in which the pavement section is due for resurfacing

Estimation of Structural Numbers

The structural number (SN) is a key variable in impact analysis. The structural number of a flexible pavement is a composite value that reflects the material composition, thickness, and location of each layer. A heavy pavement is one with a structural number of 4.6 or greater. A medium pavement has a structural number of 3.1 to 4.5. In comparison, a light pavement is one with a structural number of less than 3.0.

Using surface type and layer data from the WSPMS, structural numbers have been calculated for each impacted highway segment, using Equation 1 and typical layer coefficients.

$$SN = a_1 d_1 + a_1^* d_1^* + a_2 d_2 + a_3 d_3 \quad (1)$$

Where:

d_1 = Thickness of surface course (inches)
a_1 = Surface layer coefficient
d^*_1 = Thickness of old surface layer, which is now used as a base layer (inches)
a^*_1 = Layer coefficient of old surface layer
d_2 = Thickness of base (inches)
a_2 = Base layer coefficient
d_3 = Thickness of subbase (inches)
a_3 = Subbase layer coefficient

Many flexible pavements have been rehabilitated since the original date of construction. When an overlay is placed on a pavement, the old surface layer becomes a base layer and continues to makes a structural contribution. The term a^*_1 in Equation 1 indicates that the old surface layer is still in-place and has not been recycled.

Layer Coefficients

Layer coefficients for asphalt-concrete surface layers and other common layer materials are shown in Table 11, with one exception: coefficients for asphalt-concrete layers that have been overlain with new surface layers are shown in Table 12. As shown in Table 12, old (overlaid) asphalt-concrete surface layers that exhibit little or no cracking are generally assigned a relatively high coefficient (e.g., .35). Old asphalt-concrete layers that exhibit less than 10 percent low-severity alligator cracking are assigned a coefficient of .25 to .35, and so forth.

Table 11. Layer Coefficients Used to Compute Pavement Structural Numbers

Material	Layer Description	Layer Coefficient
Asphalt Concrete	New Top Surface Course	.44
Asphalt Concrete	Worn Top Surface Course	.35
Asphalt Concrete	Old Top Course as Base	.24-.28
Bituminous Surface Treatment	Surface Course	.20
Bituminous Surface Treatment	Base Layer	.14
Crushed Stone	Surface Course	.15
Crushed Stone	Base Course	.14
Portland Concrete Cement	Old Base	.40
Cement Treated Base	Base	.18
Gravel	Subbase	.11

Table 12. Suggested Layer Coefficients for Existing Asphalt-Concrete Surface Layers

Surface Condition	Coefficient
Little or no alligator cracking and/or only low-severity transverse cracking	0.35 to 0.40
< 10 percent low-severity alligator cracking and/or < 5 percent medium- and high-severity transverse cracking	0.25 to 0.35
> 10 percent low-severity alligator cracking and/or < 10 percent medium-severity alligator cracking and/or > 5-10 percent medium- and high-severity transverse cracking	0.20 to 0.30
> 10 percent medium-severity alligator cracking and/or < 10 percent high-severity alligator cracking and/or > 10 percent medium- and high-severity transverse cracking	0.14 to 0.20
> 10 percent high-severity alligator cracking and/or > 10 percent high-severity transverse cracking	0.08 to 0.15

Source: American Association of State Highway and Transportation Officials. *AASHTO Guide for Design of Pavement Structures*, Washington, D.C.,1993.

The extent of accumulated distress on old asphalt-concrete surface layers at the times they were overlaid is not recorded in the WSPMS. However, the time interval between placement of layers is used as a proxy for accumulated distress. If the layer was 8 years old or less at the time it was overlaid, it is given a coefficient of .35. Older layers are assigned coefficients as follows:

- 8-to-15 years: 0.28
- 15-to-20 years: 0.24
- > 20 years: 0.18

Structural Numbers of Impacted State Highways

The weighted-mean structural numbers of impacted segments of state highways are shown in Table 13. These values suggest that the primary impacts will occur on light pavement sections of Routes 17, 21, and 231.

Table 13. Structural Numbers of Impacted State Highways

State Route Number	Weighted Mean SN
2	3.60
17	2.17
21	2.15
28	4.40
90	5.19
231	2.30

County Roads

A survey was distributed to county engineers in an effort to derive similar data for impacted routes. The survey results are shown in the appendix. The information is summarized in Table 14—where surface type ACP denotes an asphalt-concrete pavement and BST indicates a bituminous surface treatment.

Table 14. Impacted County Roads in Truck Routes from CW Line to Ritzville

Road	County	Distance (Miles)	Surface Type	SN	Annual ESALs
Kiner Rd	Lincoln	3.59	BST	1.28	1,920
Kiner Rd	Lincoln	3.66	Road Mix	2.06	1,920
Rocklyn Rd	Lincoln	7.48	BST	1.16	8,821
Rocklyn Rd	Lincoln	5.05	BST	1.41	14,666
Harrington/Toyko Rd	Lincoln	11.03	ACP	3.42	25,988
Harrington/Toyko Rd	Lincoln	4.03	ACP	2.94	20,367
Waukon Rd	Lincoln	6.80	BST	1.28	18,378
Waukon Rd	Lincoln	6.39	ACP	2.26	28,356
Waukon Rd	Lincoln	4.65	BST	1.28	29,856

Table 14. Impacted County Roads in Truck Routes from CW Line to Ritzville					
Road	**County**	**Distance (Miles)**	**Surface Type**	**SN**	**Annual ESALs**
Hills Rd	Adams	3.41	BST	0.86	55,349
Danekas Rd	Adams	4.71	BST	0.86	63,236
Danekas Rd	Adams	3.20	ACP	3.00	63,236
Rosenoff Rd	Adams	12.98	BST	2.04	13,337
Schoessler Rd	Adams	0.71	ACP	2.58	25,448

The structural numbers and annual ESALs shown in Table 14 were computed from survey data (appendix), using the layer coefficients shown in Table 11. As the table suggests, Harrington/Toyko Rd may be able to accommodate additional truck traffic. However, Kiner, Rocklyn, Hills, Rosenoff, and Danekas Roads will be heavily impacted, as will segments of Waukon Road.

The annual ESALs shown in Table 14 were computed from average daily traffic and the percents of combination and single-unit trucks (appendix). It is important to note that many of these highway segments—as well as other segments not shown in Table 14—have already experienced traffic diversions from the CW line.

Incremental Truck Trips and ESALs

In previous steps, the best (shortest) routes from CW elevators to Ritzville have been identified, and baseline traffic and highway data have been developed for impacted segments. The next steps in the analysis process are to: estimate the incremental truck trips that would result from abandonment of the CW line, assign the incremental trucks to highway segments, and compute the incremental ESALs attributable to this traffic. A prerequisite step is to identify the preferred truck type, determine the net and gross weights of this truck, and (based on the axle configuration) estimate the distribution of the truck's weight among axles. Truck axle weights are often stated in kilo-pounds or kips (i.e., thousand pounds).

Preferred Truck Configuration

If the CW line is abandoned, more grain will be trucked to Ritzville in Rocky Mountain Doubles. A Rocky Mountain Double (RMD) consists of a tractor pulling a semitrailer, followed by a smaller "pup" trailer. Overall, this truck has 7 axles:

- A single steering axle on the tractor
- Two sets of tandem axles: a tractor driving axle and a tandem axle underneath the semitrailer
- Two single axles underneath the pup trailer

The RMD is assumed to have 26 wheels. Except for the steering axle, each axle on the truck is assumed to have 4 tires. When fully loaded, the RMD weighs 105,500 pounds. It is the most economical grain truck used in Washington state. More than 35 net tons can be transported in a single trip. In comparison, a 5-axle grain truck which weighs 80,000 pounds can accommodate only 26.5 net tons.

The net weight that can be loaded in a Rocky Mountain Double is constrained by the gross vehicle weight limit and the tare or empty weight of the truck. The tare weight varies with the trailers' dimensions and materials. Both the semitrailer and pup trailer are "hopper" trailers, constructed with one or more hopper bins. There are many variations in length, width, and number of bins.

Several elevator and grower associations in Washington state own Rocky Mountain Doubles and provide their own trucking services. In a previous survey, these associations reported tare weights ranging from 32,000 to 35,500 pounds. A midpoint tare weight of 33,500 pounds is used in this study. The net truck weight is computed by subtracting the tare weight from the gross weight. Thus, the payload of a grain-hauling Rocky Mountain Double is assumed to be 72,000 pounds or 36 tons. The truck's weight is distributed among axles as shown in Table 15.[5]

Table 15. Axle Weight Distributions for Rocky Mountain Double

Axle Group	Tare Weight	Gross Weight
Tractor Steering Axle	6,500	9,500
Tractor Tandem Axle	10,500	32,000
Semitrailer Tandem Axle	9,000	31,500
Pup Trailer: Axle 1	4,000	16,500
Pup Trailer: Axle 2	3,500	16,000
Total: All Axles	33,500	105,500

The Rocky Mountain Double with hopper trailers is a specialized truck. It is difficult for truckers to obtain a backhaul for these trailers. Thus, on short trips, the RMD runs empty half the time. Typically, the trucker unloads the grain at a terminal or port elevator and returns home empty.

Equivalent Truck Loads

The carloads shown in Table 1 must be converted to equivalent trucks. Each 286,000-lb railcar holds 111 tons of wheat. The smaller 268,000-lb cars hold 102 tons each. The types of cars used on the CW line are unknown. To avoid

[5] The distributed gross weight of the truck (Column 3 of Table 15) is based on data from Transportation Research Board's Special Report 225—*Truck Weight Limits: Issues and Options*. All of the distributed weights conform to legal axle weight limits and to Bridge Formula B.

understating highway impacts, it is assumed that the 2,150 carloads are 286,000-lb cars. If this is true, each railcar is equivalent to 3.08 Rocky Mountain Double trucks. Thus, the 2,150 carloads on the line may be equivalent to 6,600 trucks per year.

When discussing traffic, it is important to note that the 2005 carload estimate understates traffic on the line when a multi-year average is used. The most relevant carload measure is the traffic that would have been shipped under normal service and operating conditions. This unknown value is greater than 2,150 carloads.

Equivalent Truck Axle Loads

The impacts of a truck depend primarily upon the structural characteristics of the pavement and the truck's axle configuration and weights. In pavement impact analysis, the effects of different axle types are accounted for by converting the axle weights to equivalent single-axle loads. An ESAL represents the impact of a certain axle type and load in comparison to the impact of an 18,000-pound single axle. For example, an axle with an ESAL factor of 1.2 has 1.2 times the impact of a single 18,000-pound axle. In general, tandem axles cause less damage per ton than single axles. For example, a 34,000-pound tandem axle generates only 1.1 times the impact of an 18,000-pound single axle on a flexible pavement.

The ESAL factors used in this study are computed from equations developed by the American Association of State Highway and Transportation Officials (AASHTO). A truck ESAL factor is computed for each impacted highway segment that the truck traverses. These calculations use the AASHTO axle-load equivalency formulas for single and tandem axles. Separate formulas are used for flexible and rigid pavements.

The internal ESAL calculations are illustrated in Tables 16 and 17. These hypothetical values correspond to a flexible pavement with a structural number of 2.5, a design PSI of 4.5, and a terminal PSI of 3.0.[6] The ESAL factors vary for each highway section according to the structural number and terminal serviceability rating.

As this illustration suggests, empty truck movements generate relatively few ESALS. However, each loaded movement generates more than 3.25 ESALs. If the soil resilient modulus is 4,000 psi, this hypothetical highway segment could accommodate approximately 143,000 ESALs before reaching its terminal serviceability. If 4,500 RMD trucks travel this highway each year, its life expectancy is less than 10 years.

[6] PSI is Pavement Serviceability Index, which ranges from 0 to 5. A new or design PSI is typically 4.5, while a terminal PSI is 3.0 or 2.5.

Table 16. Illustration of ESAL Factors for Empty Rocky Mountain Double		
Axles in Group	**Weight on Axles (kips)**	**ESALs**
1	6.5	0.0350
2	10.5	0.0226
2	9.0	0.0130
1	4.0	0.0061
1	3.5	0.0038
Totals	**33.5**	**0.0805**

Table 17. Illustration of ESAL Factors for Loaded Rocky Mountain Double		
Axles in Group	**Weight on Axles (kips)**	**ESALs**
1	9.5	0.1225
2	32.0	0.9003
2	31.5	0.8522
1	16.5	0.7295
1	16.0	0.6545
Totals	**105.5**	**3.2590**

Pavement Analysis Methods

Pavement Resurfacing and Reconstruction Costs

According to data provided by county engineers, it typically costs from $210,000 to $220,000 per mile to resurface a two-lane highway in eastern Washington with a 3- to 4-inch layer of hot mix asphalt. This corresponds to a paving cost of approximately $73,000 per inch per mile. Reconstruction is much more expensive—costing $550,000 per mile. These paving costs are used for both state and county highways.

Analysis of State Highways

Impacted state highways are analyzed using the incremental thickness method, which is described in the 2002 report *Implications of Rail-line Abandonment for Pavement Preservation in Eastern Washington*. The incremental thickness method is an abstract representation of the pavement rehabilitation process using overlays. It is based on the AASHTO rehabilitation/overlay method and uses AASHTO pavement design equations. The objective of the method is to determine the additional overlay thickness needed to provide the enhanced structural capacity necessary to accommodate the new truck traffic.

The incremental method is sensitive to the accuracy of baseline data and forecasts of additional truck traffic. It is premised upon several key assumptions:

- The impacted highway segments have been designed using AASHTO pavement design guidelines
- The structural numbers of the pavements are closely matched to the projected baseline truck traffic for the current design period
- Asphalt pavements are being preserved or rehabilitated through pavement overlays

These assumptions are clearly satisfied for state highways. WSDOT has used AASHTO design procedures for several decades. Pavement thicknesses and structural numbers are closely matched to historic truck traffic levels. Moreover, as part of its long-term pavement preservation program, WSDOT strives to resurface pavements in a timely manner to protect the underlying materials and provide a consistent performance period.

The Overlay Method of Restoring and Adding Structural Capacity

Overlays are the most common cost-effective method of restoring and increasing the structural capacity of pavements. At the time of an overlay, the existing surface layer may exhibit distresses such as fatigue (or alligator) cracking in the wheel paths, rutting in the wheel paths, transverse (longitudinal) cracking, etc. Because of accumulated distresses, the surface and base layers may no longer provide the structural capacity they once did—i.e., the layer coefficients of the distressed layers are less than when they were new. Thus, an overlay may be needed to restore the structural number of the pavement to its design level. With incremental truck traffic, a thicker-than-normal overlay may be needed to restore and add structural capacity to a roadway in the same project. The SN of a flexible pavement increases at a rate of .44 per inch of new asphalt-concrete surface layer.

Pavement Design Equation

The incremental thickness method uses the AASHTO pavement design equations. A similar approach was used in TRB Special Report 225.[7] The AASHTO equation for designing flexible pavements is shown in Equation 2:

$$Log_{10}(W_{18}) = 9.36 * Log_{10}(SN+1) - .20 + \frac{Log_{10}(\Delta PSI/1.7)}{.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 * Log_{10}(M_R) - 8.07 \qquad (2)$$

Where:

W_{18}= Predicted number of 18-kip equivalent single-axle loads (ESALs)
SN= Structural number
PSI= Pavement serviceability index

[7] Transportation Research Board. *Truck Weight Limits: Issues and Options*. Special Report 225, 1990.

MR= Resilient modulus of soil (psi)
Log_{10}= Common logarithm to the base 10

In Equation 2, once ΔPSI and resilient modulus are determined, the required structural number becomes a function of the design (projected) ESALs.

Elasticity of Structural Number with Respect to ESALs

The relationship between SN and ESALs is simulated for a range of potential designs by incrementing the value of SN in Equation 2 by very small increments. This simulation creates a set of "observations" of structural numbers and corresponding ESALs. The log of ESALs is then regressed against the log of SN to determine the slope coefficient.

TRB Special Report 225 concluded that the slope coefficient is 0.15 when the SN ranges from 3 to 5, the terminal serviceability (PSI) is 2.7, and the resilient modulus is 6,250 psi. The numerical approach used in this study yields the same slope estimate (0.1535) for the same range and assumed terminal PSI and MR. This coefficient is interpreted as the percentage change in structural number corresponding to a one percent change in ESALs. However, it is important to note that this coefficient is valid only for a limited range of structural numbers.

Table 18 shows a set of slope coefficients or elasticities for structural classes of pavements. A coefficient in Table 18 represents the percentage change in structural number corresponding to a one percent change in ESALs for a given class of pavement. For example, the slope coefficient for light-duty flexible pavements is .178. This means that when a one percent increase in ESALs occurs on a light-duty flexible pavement the structural number must be increased by .178 percent to maintain the same performance period. In comparison, a one percent increase in ESALs on a heavy flexible pavement section means that the structural number must be increased by .142 percent to maintain the same performance period. The structural capacity of rigid or concrete pavements is represented by the slab thickness (D).

Table 18. Elasticity of Pavement Structural Number with ESALs

	Flexible Pavement		Rigid Pavement	
Structural Class	SN Range	Slope Coefficient	D Range	Slope Coefficient
Heavy	4.6 – 6.0	0.14204	9.1 – 14.0	0.14923
Medium	3.1 – 4.5	0.16700	7.1 – 9.0	0.16569
Light	1.0 – 3.0	0.17766	5.0 – 7.0	0.19510

Key Calculations

In order to implement this procedure, the current (design) ESALs and the current (design) structural number must be known for each impacted highway

segment. Both inputs are derived from the 2005 WSPMS. The procedure is implemented as follows:

- The percent increase in ESALs for an impacted segment is computed by dividing the ESALs generated from the potential abandonment by the existing ESALs and multiplying by 100
- The percent increase in structural number is computed from the appropriate slope coefficient in Table 18
- The numerical increase in structural number is computed by multiplying the design (current) SN by the percent increase divided by 100
- The increased overlay thickness is computed by dividing the increase in structural number by .44 − the layer coefficient for new asphalt concrete
- The incremental cost is computed by multiplying the cost per inch by the incremental inches of thickness.

This approach assumes that:

- The incremental thickness is added at the time the pavement is scheduled for preservation resurfacing
- The incremental thickness is allowed to vary as a ratio-scaled variable− i.e., it is possible to increase the normal overlay thickness by fractions of an inch

County Road Impact Methods

Historically, county roads have experienced relatively low traffic volumes. Moreover, county governments have limited financial resources with which to rebuild highways. Therefore, impacted county roads may not be structurally optimal.

The recent diversion of traffic from the CW line has already increased ESAL loads on many roads. In effect, there are mismatches between existing structural numbers and ESALs. In such situations, the incremental method may understate the highway rebuilding costs required to transform low-volume county roads into truck routes. Moreover, it is impossible to determine the proportion of current truck traffic that consists of shipments diverted from the CW line during the last several years.

For these reasons, a different approach is used for county roads. Equation 2 is used directly to determine the structural number required for existing and incremental traffic. The existing structural number is subtracted from the new structural number to determine the required increase in SN. The remaining steps in the process are the same as those described previously for state highways.

In this approach, the new structural number may be attributable to both existing and incremental truck traffic. This approach is justified because much of the baseline traffic was diverted from the line previously, or is the result of direct

movements from farms to the Templin Terminal. However, this method is not a purely incremental one.

After the increased structural numbers and pavement thicknesses have been determined, the estimated surface layer thicknesses are compared to the minimum design thicknesses shown in Table 19. If a surface layer is thinner than the recommended thickness shown for the design ESALs, then the minimum thickness is used. This adjustment was needed for only two of the segments shown in Table 14.

Table 19. Minimum Surface Layer Thicknesses Used In Pavement Analysis

Forecast ESALs over Design Life	Minimum Layer Thickness (Inches)
≤ 50,000	1.0
50,001 - 150,000	2.5
150,001 - 500,000	3.0
500,001 - 2,000,000	4.0
2,000,001 - 7,000,000	5.0
>7,000,000	5.5

American Association of State Highway and Transportation Officials, *AASHTO Guide for Design of Pavement Structures*, Washington, D.C., 1986.

No specific information is available regarding the resilient modulus of the soils underlying the county roads, or whether the soils have been stabilized. The Adams and Lincoln county engineers have indicated that most of the base layers need to be fully reconstructed. Given this uncertainty, a low-average resilient modulus of 3,500 psi is used in the model. This is consistent with the soil modulus at the AASHTO road test.

Results of Analysis

Impacted County Roads

Initially, the results of the county road impact model are compared to the detailed estimates prepared by county engineers. The model estimates are shown in Column 3 of Table 20, while the county engineers' estimates are shown in Column 2. Adams County prepared only reconstruction estimates for Danekas and Hills Roads. The resurfacing cost estimates shown in Table 20 have been computed by multiplying the segment lengths by $220,000 per mile.

Overall, the two sets of estimates are very close. The thicknesses predicted by the model vary from segment-to-segment, whereas the county estimates are relatively constant—e.g., 3- or 4-inch overlays. Nevertheless, the overall results are nearly identical.

Table 20. Comparison of Estimated Resurfacing Costs for Impacted County Roads		
	Source	
Impacted Highways	County	Model
Danekas Rd	$1,740,200	$ 2,306,832
Harrington / Toyko Rd	$-	$-
Hills Rd	$ 750,200	$ 1,211,037
Kiner Rd	$1,540,000	$ 1,112,263
Monson Rd	$1,322,200	$ 1,613,084
Rocklyn Rd	$2,358,400	$ 2,540,535
Rosenoff Rd	$2,855,600	$ 2,039,714
Schoessler Rd	$ 156,200	$ 111,571
Waukon Rd	$3,924,800	$ 3,705,051
Total	**$ 14,647,600**	**$ 14,640,089**

The surface layer thickness predicted by the model for three of the county road segments exceeds 4 inches. The counties have targeted these segments for reconstruction because of inadequate bases. Resurfacing these segments may prove to be an inefficient solution. Thus, an alternative cost estimate is shown in Table 21, wherein portions of Danekas, Hills, Monson, and Waukon Roads are reconstructed. The total cost of this solution is $21.7 million.

Table 21. Cost of Resurfacing with Selective Reconstruction Improvements		
Highway	Reconstruction	Resurfacing
Danekas Rd	$2,273,988	$ 704,000.00
Harrington/Toyko Rd		
Hills Rd	$1,746,261	
Kiner Rd		$ 1,540,000
Monson Rd	$3,305,500	$ 1,322,200
Rocklyn Rd		$ 2,358,400
Rosenoff Rd		$ 2,855,600
Schoessler Rd		$ 156,200
Waukon Rd	$2,557,500	$ 2,901,800
Totals	$9,883,249	$ 11,838,200

Before discussing impacted state highways, it must be noted that the actual cost of county road improvements may greatly exceed $21.7 million. Collectively, the counties have estimated $51.4 million of highway investment costs attributable to the CW line. In some cases, these estimates assume that trucks will continue on county roads for the entire journey instead of switching to SR-21 en route. Apparently, much of the additional cost relates to traffic originated

from elevators at Govan, Mondovi, and other locations which switched to trucks several years ago. These stations (and the traffic which they generate) are not considered in this study, because the elevators are not currently shipping by rail.

Many additional roadway segments in Adams county are being impacted by these movements, as well as by direct farm to terminal movements. Clearly, $21.7 million understates the total cost when all grain truck traffic is considered. However, these additional movements cannot be analyzed within the time frame of this study, or without detailed information from elevator managers.

State Highway Impacts

The state highway impact model indicates that an additional $3.4 million in resurfacing costs will be incurred in future years. Of this total, $2.82 million will be needed for SR-21, portions of which have structural numbers of less than 2.

In the state highway model, these additional outlays are incurred when WSDOT resurfaces the pavements in the future. Thus, the present value of these costs will be less than $3.4 million. However, the due years for many of the impacted segments will be moved forward in time. A "build-sooner" analysis—such as the one conducted in the 2002 study—is needed to refine these estimates. However, such an analysis is time consuming. Moreover, state highway impacts are probably understated because some of the BST segments will need to be reconstructed. These are specific engineering decisions which cannot be modeled easily without field data. Therefore, when all things are considered, the $3.4 million estimate is probably quite conservative and should not be adjusted downward.

It must be noted that the incremental truck traffic will generate significant highway revenues. In the 2002 study, RMD trucks were estimated to generate 16 cents per each vehicle-mile. At this rate, the incremental trucks will generate $144,000 per year in new highway revenue. If the same discount rate is used as in the 2002 study (4.33%), the present value of the truck revenue stream will be $1.15 million over a 10-year period. Although these revenues are significant, they are quite small in comparison to the projected costs.

Conclusion

This report has presented two sets of cost estimates: (1) those prepared by county engineers, and (2) those derived from the impact models described previously. The estimates range from $25.1 million to more than $50 million. The higher county estimates consider traffic from elevators that are not currently shipping by rail, as well as other potential grain truck impacts. There are some differences between the two sets of cost estimates as a result of route selection. The county estimates reflect more specific soil and roadbed condition data.

When highway impacts are viewed comprehensively, the overall impacts are probably closer to the upper end of the range than to the lower end.

The detailed results of the county road surveys are presented in the appendix.

Appendix. Results of County Road Survey

Traffic and Pavement Information for Lincoln County Highway Segments

Lincoln County—From US-2 to the Junction of Monson Road and SR-21: Structural Highway Data								
				If SN is not available, please provide base/subbase layer data				
					Base Layer		Subbase Layer	
Highway Segment	Miles	Surface/ Pavement Type*	Surface Layer Thickness (in.)	Structural Number	Thickness (in.)	Material	Thickness (in.)	Material
Kiner Road	3.59	BST	1		3	Top Course	6	Base Course
Kiner Road	3.66	Road Mix	3		4.5	Top Course	7.5	Base Course
Monson Road	6.01	BST	1		3	Top Course	5	Base Course

* Unpaved, BST, ACP, PCCP, Road Mixed w/ MC-250

Lincoln County—From US-2 to the Junction of Monson Road and SR-21: Traffic Data					
Highway Segment	Miles	AADT	Percent Single-Unit Trucks	Percent Combination Trucks	Gross Weight Limit (pounds)
Kiner Road	3.59	76	23	6	Legal Loads
Kiner Road	3.66	76	23	6	Legal Loads
Monson Road	6.01	182	7.4	33	Legal Loads

Note: Lincoln County added this road due to the fact that truck traffic continues south to SR 28.

Lincoln County—From Monson Road Intersection South to Grant County to SR 28: Structural Highway Data								
				If SN is not available, please provide base/subbase layer data				
					Base Layer		Subbase Layer	
Highway Segment	Miles	Surface/ Pavement Type*	Surface Layer Thickness (in.)	Structural Number	Thickness (in.)	Material	Thickness (in.)	Material
Kiner Road	13.04	BST	1		3	Top Course	6	Base Course

* Unpaved, BST, ACP, PCCP,

Lincoln County—From US-2 to the Junction of Monson Road and SR-21: Traffic Data					
Highway Segment	Miles	AADT	Percent Single-Unit Trucks	Percent Combination Trucks	Gross Weight Limit (pounds)
Kiner Road	13.04	247	7	51	Legal Loads

Lincoln County—From Govan Grain Elevators South to the Junction of Monson Road: Structural Highway Data (Anticipated truck route)								
				If SN is not available, please provide base/subbase layer data				
					Base Layer		Subbase Layer	
Highway Segment	Miles	Surface/ Pavement Type*	Surface Layer Thickness (in.)	Structural Number	Thickness (in.)	Material	Thickness (in.)	Material
Govan Road	3.92	BST	1		3	Top Course	6	Base Course
Govan Road	5.04	Gravel	3		4	Base Course		

* Unpaved, BST, ACP, PCCP,

Lincoln County—From Govan Grain Elevators South to the Junction of Monson Road: Structural Highway Data (Anticipated truck route)					
Highway Segment	**Miles**	**AADT**	**Percent Single-Unit Trucks**	**Percent Combination Trucks**	**Gross Weight Limit (pounds)**
Govan Road	3.92	7	?	?	Legal Loads
Govan Road	5.04	24	?	?	Legal Loads

Lincoln County—Rocklyn Road from US-2 to the Junction of Coal Creek/Harrington Road: Structural Highway Data								
				If SN is not available, please provide base/subbase layer data				
					Base Layer		**Subbase Layer**	
Highway Segment	**Miles**	**Surface/ Pavement Type**	**Surface Layer Thickness (in.)**	**Structural Number**	**Thickness (in.)**	**Material**	**Thickness (in.)**	**Material**
Rocklyn Road	7.48	BST	1.5		3	Top Course	4	Base Course
Rocklyn Road	5.05	BST	1.5		4	Top Course	5	Base Course

* Unpaved, BST, ACP, PCCP, Road Mixed w/ MC-250

Lincoln County—Rocklyn Road from US-2 to the Junction of Coal Creek/Harrington Road: Traffic Data					
Highway Segment	**Miles**	**AADT**	**Percent Single-Unit Trucks**	**Percent Combination Trucks**	**Gross Weight Limit (pounds)**
Rocklyn Road	7.48	114	38	12	Legal Loads
Rocklyn Road	5.05	205	19	6	Legal Loads

Lincoln County—Harrington to Adams County Line: Structural Highway Data								
				If SN is not available, please provide base/subbase layer data				
					Base Layer		Subbase Layer	
Highway Segment	Miles	Surface/ Pavement Type	Surface Layer Thickness (in.)	Structural Number	Thickness (in.)	Material	Thickness (in.)	Material
Harrington/Tokio Road	11.03	ACP	3		6	Top Course	6	Base Course
Harrington/Tokio Road	4.03	ACP	3		4	Top Course	6	Base Course

Lincoln County—Harrington to Adams County Line: Traffic Data					
Highway Segment	Miles	AADT	Percent Single-Unit Trucks	Percent Combination Trucks	Gross Weight Limit (pounds)
Harrington/Tokio Road	11.03	356	15	14	Legal Loads
Harrington/Tokio Road	4.03	450	6	10	Legal Loads

Lincoln County—From Mondovi at PCC Rail Crossing to US-2: Structural Highway Data								
				If SN is not available, please provide base/subbase layer data				
					Base Layer		Subbase Layer	
Highway Segment	Miles	Surface/ Pavement Type	Surface Layer Thickness (in.)	Structural Number	Thickness (in.)	Material	Thickness (in.)	Material
South Mondovi Road	0.87	Road Mix	2		6	Top Course	0	
Sunset Road East to Bennett Rd.	0.25	Road Mix	2		6	Top Course	0	
Bennett Road to US-2	1.02	Road Mix	2		6	Top Course	0	

* Unpaved, BST, ACP, PCCP, Road Mixed w/ MC-250

Lincoln County—From Mondovi at PCC Rail Crossing to US-2:

Traffic Data					
Highway Segment	**Miles**	**AADT**	**Percent Single-Unit Trucks**	**Percent Combination Trucks**	**Gross Weight Limit (pounds)**
South Mondovi Road	0.87	216	3	6	Legal Loads
Sunset Road East to Bennett Rd.	0.25	216	3	6	Legal Loads
Bennett Road to US-2	1.02	216	3	6	Legal Loads

Lincoln County—From US-2 to US 231: Structural Highway Data								
				If SN is not available, please provide base/subbase layer data				
					Base Layer		**Subbase Layer**	
Highway Segment	**Miles**	**Surface/ Pavement Type**	**Surface Layer Thickness (in.)**	**Structural Number**	**Thickness (in.)**	**Material**	**Thickness (in.)**	**Material**
Waukon Road	6.80	BST	1		3	Top Course	6	Base Course
Waukon Road	6.39	ACP	2		3	Top Course	6	Base Course
Waukon Road	4.65	BST	1		3	Top Course	6	Base Course

* Unpaved, BST, ACP, PCCP, Road Mixed w/ MC-250

Lincoln County—From US-2 to US 231: Structural Highway Data					
Highway Segment	**Miles**	**AADT**	**Percent Single-Unit Trucks**	**Percent Combination Trucks**	**Gross Weight Limit (pounds)**
Waukon Road	6.80	265	10	15	Legal Loads
Waukon Road	6.39	332	21	15	Legal Loads
Waukon Road	4.65	338	13	15	Legal Loads

Lincoln County Cost Estimates for Impacted Highways

County Roads Most Affected:

Road Name	Road No.	Length in Miles
Kiner Road	9115	20.29
Govan Road	1613	8.96
Monson Road	1528	6.01
Rocklyn Road	9255	10.72
Coffee Pot Road	9240	1.61
Waukon Road	9335	17.84

Preferred Option - Major Rebuild of Affected Roads. Sub-structure Reconstruct with 4" Hot Mix Asphalt overlay

*Kiner Road	8,959,500
**Govan Road	3,278,000
Monson Road	3,305,500
***Rocklyn Road	4,296,000
Coffee Pot Road	885,500
Waukon Road	9,812,000
Total Cost	**$30,536,500**

* Four miles of this road have been reconstructed.
** Three miles of this road have been reconstructed
*** Have 1.6 million dollars to do 5.80 miles of Rocklyn Road. Need an additional 1.2 million to add 4" of Hot Mix Asphalt.

Second Option - Overlay Without Sub-structure Rebuild
Resurface Roads with 4" of Hot Mix Asphalt

Kiner Road	4,463,800
Govan Road*	3,938,000
Monson Road	1,322,200
Rocklyn Road	2,358,400
Coffee Pot Road	354,200
Waukon Road	3,924,800
Total Cost	$16,361,400

* Five miles need to be reconstructed.
Costs: $60 per ton for Hot Mix Asphalt in place. Equates to $220,000 per mile. $550,000 per mile for reconstruction. Includes 4" of HMA.

Additional Future Costs if Second Option is Selected. Overlay costs of all roads including Harrington/Tokio in the next 15-20 years = $17,700,000 + inflation.

Data for Impacted Highways in Adams County

Highway Name	Highway Segment	Miles	AADT	Percent Single Unit Trucks	Percent Combination Trucks	Existing Pavement Type	Existing Surfacing Thickness	Existing Base Material	Existing Base Layer Thickness (ft)
Hills Rd	Lincoln Co. Line to Danekas Rd	3.41	446	5%	32%	BST	0.15'	Gravel	0.30
Danekas Rd	Hills Rd to Schoessler Rd	4.71	525	5%	31%	BST	0.15'	Gravel	0.30
Danekas Rd	Schoessler Rd to Ritzville City Limits	3.2	525	5%	31%	ACP	0.25'	Gravel	1.00
Rosenoff Rd	SR 21 to Ritzville City Limits	12.98	203	5%	16%	BST	0.15'	Gravel	1.00
Schoonover Rd	Rosenoff Rd to Lincoln Co. Line	8.89	118	4%	17%	BST	0.15'	Gravel	0.30
Paha/Packard Rd	Rosenoff Rd to Lincoln Co. Line	8.84	153	9%	19%	BST	0.15'	Gravel	0.30
Marcellus Rd	Rosenoff Rd to Davis Rd	8.91	329	11%	14%	BST	0.15'	Gravel	0.30
Davis Rd	Marcellus to Lincoln Co. Line	2.65	102	15%	15%	BST	0.15'	Gravel	0.30
Schoessler Rd	Danekas Rd to I-90	0.71	420	4%	15%	ACP	0.17'	Gravel	1.00

Highway Name	Miles	Improvement Type *	Improvement Base Layer Thickness	Subbase Costs per Mile	Base Costs per Mile	Surfacing Costs per Mile	Total Costs per Mile	Total Cost for Segment
Hills Rd	3.41	RC,ACP.25	0.75'	$200,000.00	$107,400.00	$204,700.00	$512,100.00	$1,746,261.00
Danekas Rd	4.71	RC,ACP.25	0.75'	$170,700.00	$107,400.00	$204,700.00	$482,800.00	$2,273,988.00
Danekas Rd	3.2	ACP.25	0.00			$220,000.00	$220,000.00	$ 704,000.00
Rosenoff Rd	12.98	ACP.25	0.00			$220,000.00	$220,000.00	$2,855,600.00
Schoonover Rd	8.89	RC,3BST	0.9'	$268,000.00	$126,575.00	$61,700.00	$456,275.00	$4,056,284.75
Paha/Packard Rd	8.84	RC,3BST	0.9'	$268,000.00	$126,575.00	$61,700.00	$456,275.00	$4,033,471.00
Marcellus Rd	8.91	RC,3BST	0.9'	$268,000.00	$126,575.00	$61,700.00	$456,275.00	$4,065,410.25
Davis Rd	2.65	RC,3BST	0.9'	$170,700.00	$126,575.00	$61,700.00	$358,975.00	$ 951,283.75
Schoessler Rd	0.71	ACP.25	0.00			$220,000.00	$220,000.00	$ 156,200.00
Total Cost								**$20,842,498.75**

* Improvement Type:
Reconstruct & .25' Thick ACP Surface = RC,ACP.25
Reconstruct & Triple BST Surface = RC,3BST
.25 ' Thick Asphalt Overlay = ACP.25