

PLT Meeting No. 10

CDOT Interregional Connectivity Study Level 3 Evaluation Early Results



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DECEMBER 18, 2013

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Our objective is to address the following:

- ▶ What we heard from you at the last PLT meeting
- ▶ What we heard from the public meetings
 - Windsor
 - Golden/Denver
 - Colorado Springs
 - Pueblo
- ▶ Updated Cost information
- ▶ Key conclusions of the final study – engineering, financial, environmental
- ▶ Next steps
- ▶ Round Table Discussion



- ▶ MOS must be successful, not just cost effective
 - ▶ We need a vision and great political will
 - ▶ We need to begin to understand that we will need to pay for our future transportation system
-
- ▶ The MOS should include key connection to DIA; concern over lack of direct connection to DUS
 - ▶ MOS approach - cost effective segment by segment approach vs. “go big or go home”; best opportunity for equitable distribution of service/support
 - ▶ MOS in Mountain corridor because of political organization in the corridor, congested conditions and opportunity for implementing “vision”
 - ▶ Continue to accommodate all technologies at this stage

- ▶ Interest in ensuring future commuter rail and HSR can coexist and that they be planned as a system
- ▶ HSR does not offer the additional stops, frequency and flexibility of commuter rail along 287 corridor
- ▶ Do not want to encourage sprawl in development of stations
- ▶ Agreed with recommended phasing of MOS
- ▶ Supportive of ICS HSR Vision and find it great way to address future congestion along front range



- ▶ Recommended phasing of MOS supported
- ▶ Building of MOS should occur opposite that of the commuter rail
- ▶ Consideration should be given to corridor with greatest traffic congestion and alternative mode needs
- ▶ Linking to DIA should be the highest priority
- ▶ General agreement with study findings, numbers and decision-making; supportive of ICS HSR Vision for Colorado
- ▶ Save the Chief!



- ▶ Time to think about our future transportation system differently; concern over paving more lanes on I-25
- ▶ Important to link HSR service from the south with DIA
- ▶ Need for more expansive local transit systems in all these communities to support connectivity to/from the HSR station
- ▶ Very supportive of ICS HSR Vision
- ▶ Shift in focus to “next steps”



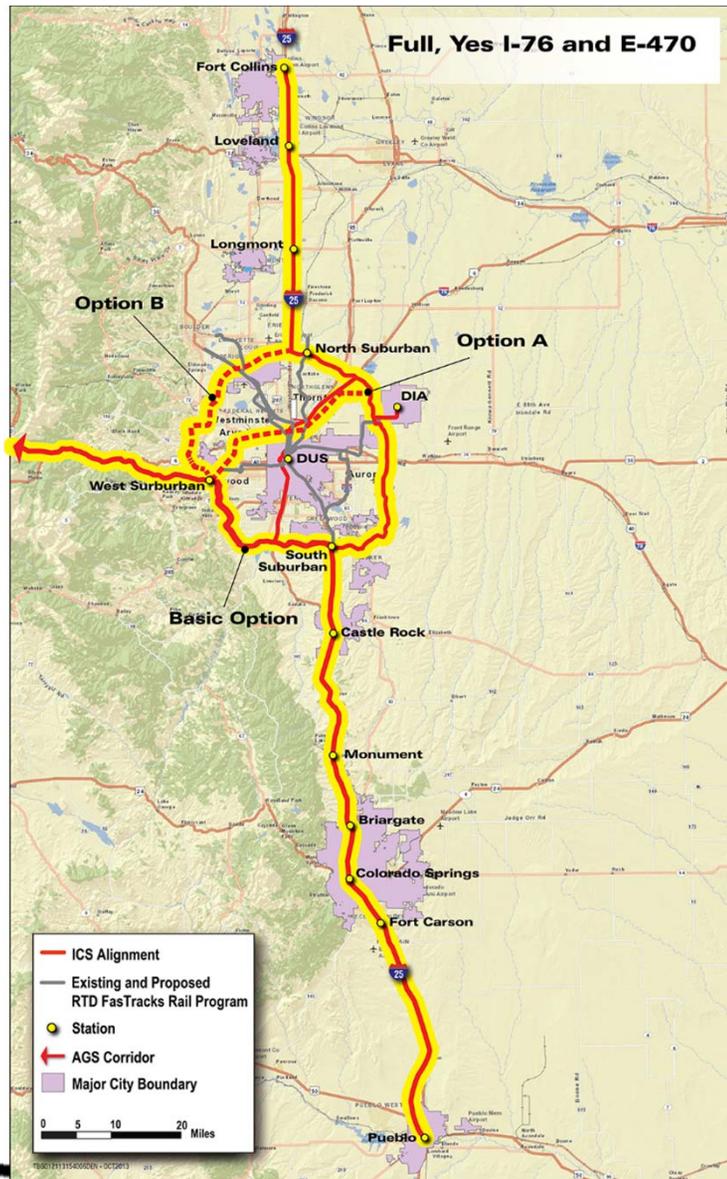


- ▶ Include Pueblo as the southern-most station in the IOS
- ▶ Ensure Pueblo's connections with Colorado Springs and Denver markets
- ▶ Allow Pueblo to provide manpower and steel for implementation of the system
- ▶ Think about transportation differently and support modes beyond roadway infrastructure
- ▶ Strong support for the ICS HSR full-build Vision connecting state's population centers, commercial/tourism industry and major airport

Update on Costs and Performance



HST Vision forms the basis...



Scenario Description

- ▶ North:
 - North Suburban to Fort Collins
- ▶ Metro:
 - West Suburban to DIA via C-470, I-76 or NWQ
 - North to South Suburban via E-470
- ▶ South:
 - South Suburban to Pueblo
- ▶ West:
 - West Suburban to Eagle County Regional Airport

Measure

- Total Mileage – 340
- Capital Cost - ~\$30.1 B
- OPEX - \$198.4 M/yr
- Ridership - 18.3 M
- Revenue - \$344 M
- OPEX Ratio - 1.7
- Sales Tax Impact (16 counties): 1.93%

Cost comparison by ICS/AGS Option

ICS LPA Options	ICS LPA	AGS LPA	HST Vision
LPA- Base	\$16.6	\$13.5	\$30.1
LPA- I-76	\$13.4	\$16.7	\$30.1
LPA-NWQ	\$17.8	\$13.5	\$31.3

Ridership/Revenue Comparison by LPA Option

Scenario	Ridership (millions/year)	Revenue (millions/year)
LPA-Base	18.3	\$344
LPA-I-76	18.2	\$342
LPA-NWQ	17.7	\$330
LPA-Base(all Maglev)	19.1	\$381

How Did the Costs Change?

Segment to Segment comparison - NO VMF/Layover facilities, Stations directly related to segments included (DIA counted in both B3 and B4, no other duplicates)

Segment	Level 2	Level 3 Full double track	Level 3 VE Opt 1	L2 - (L3 Full Dbl) Δ	L2 - (L3 VE-1) Δ	(L3 Full Dbl) - (L3 VE-1) Δ
NS to Fort Collins	\$ 1.676	\$ 3.063	\$ 2.512	\$ (1.387)	\$ (0.836)	\$ 0.552
DIA to NS (B-4)	\$ 1.088	\$ 1.565	\$ 1.565	\$ (0.477)	\$ (0.477)	\$ -
SS to DIA (B-3)	\$ 2.015	\$ 2.584	\$ 2.584	\$ (0.569)	\$ (0.569)	\$ -
SS to Pueblo	\$ 6.879	\$ 6.996	\$ 6.446	\$ (0.116)	\$ 0.433	\$ 0.550
SS to WS (B-2)	\$ 1.623	\$ 2.270	\$ 2.270	\$ (0.647)	\$ (0.647)	\$ -
NS to WS (B-1)	\$ 2.149	\$ 3.599	\$ 3.599	\$ (1.450)	\$ (1.450)	\$ -
I-76 (E-5 & W-5)	\$ 2.613		\$ 2.114		\$ 0.499	
Denver Metro (B-1, B-2, B-3, B-4, E-5 & W-5)	\$ 9.489		\$ 12.132		\$ (2.643)	

Scenario to Scenario Comparison (without vehicles)

Scenario	Level 2	Level 3 Full double track	Level 3 VE Opt 1	L2 - (L3 Full Dbl) Δ	L2 - (L3 VE-1) Δ	(L3 Full Dbl) - (L3 VE-1) Δ
LPA Base (B2A)	\$ 13.397	\$ 16.505	\$ 15.406	\$ (3.108)	\$ (2.009)	\$ 1.099
LPA I-76 (A5 I-76)	\$ 14.126		\$ 14.518		\$ (0.392)	
LPA NWQ (B5)	\$ 13.945		\$ 16.653		\$ (2.708)	

HST Vision Conceptual **Shortfall**

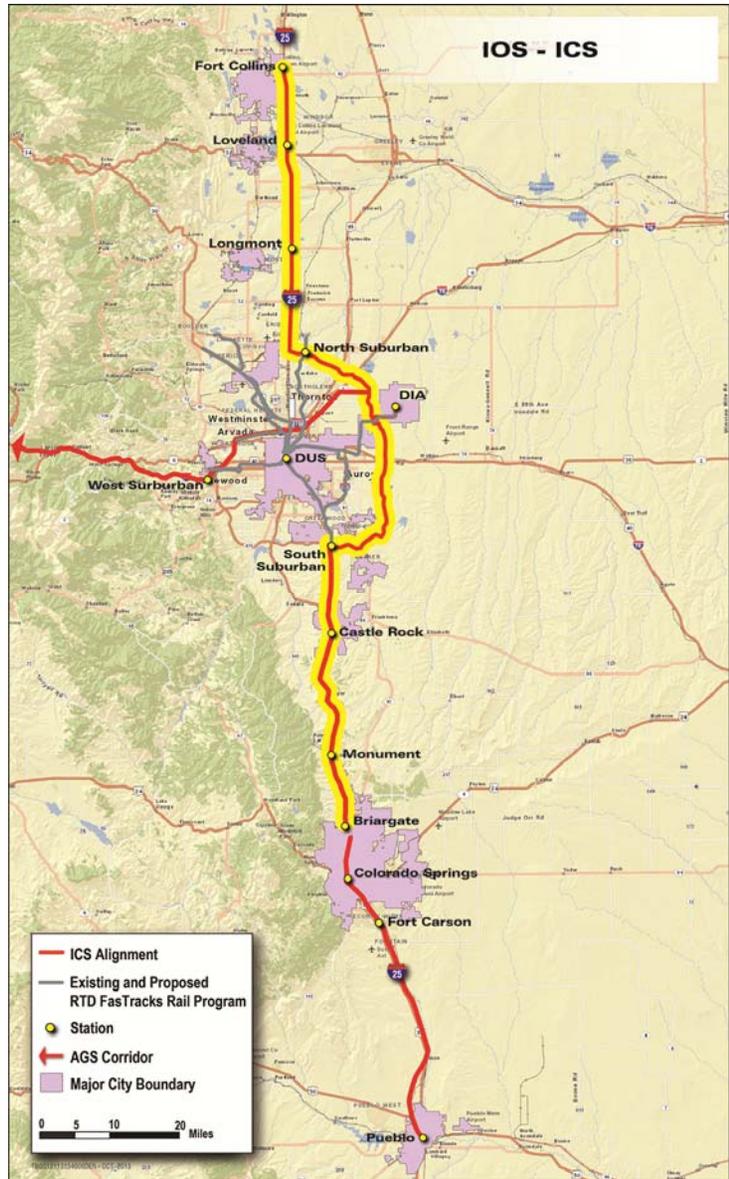
Inputs	Total	Start 2026	2035	2041	2042	2043	2044	Finish 2055
Requirements								
CAPEX	\$30,100.0							
CAPEX Replacement - Vehicles (Yr 17 - 20)	\$550.0			\$137.5	\$137.5	\$137.5	\$137.5	
CAPEX Replacement - Systems @ 3.3% of Systems CAPEX	\$3,168.5	\$109.3	\$109.3	\$109.3	\$109.3	\$109.3	\$109.3	\$109.3
CAPEX Replacement - Guideway @.005% CAPEX	\$2,618.7	\$90.3	\$90.3	\$90.3	\$90.3	\$90.3	\$90.3	\$90.3
Financial Cost During Construction @5%	\$1,505.0							
Total CAPEX	\$37,942.2							
Funding Sources								
Federal Funding @ 50%	\$15,802.5							
Local Contributions (stations)	\$425.0							
Remaining CAPEX	\$21,714.7							
Capital Recovery	\$1,255.11	\$1,255.11	\$1,255.11	\$1,255.11	\$1,255.11	\$1,255.11	\$1,255.11	\$1,255.11
Income								
Fare Box	\$9,349.20	224.4	342	342	342	342	342	342
Ancillary Revenue	\$295.8	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Less: OPEX	\$5,753.6	198.4	198.4	198.4	198.4	198.4	198.4	198.4
Net Cash	\$3,891.4	\$36.2	\$153.8	\$153.8	\$153.8	\$153.8	\$153.8	\$153.8
Shortfall		-\$1,218.91	-\$1,101.31	-\$1,101.31	-\$1,101.31	-\$1,101.31	-\$1,101.31	-\$1,101.31

What Can We Conclude Here?

▶ All of the performance factors are about the same regardless of the LPA Option:

- Ridership will be about 18 million per year
- Revenues will be about \$340 million per year
- OPEX and BC ratios will be positive
- Costs will be about \$30 billion for the HST Vision program
- Stations and mobility benefits will be nearly analogous
- Selection of the best east to west alignment will be a future decision
- The decision on the E-W option will be determined through NEPA
- The HST Vision will need to be phased due to cash flow
- A major new state revenue source will be needed

Recommended Initial Operating Segment



<u>Scenario Description</u>	<u>Measure</u>
<ul style="list-style-type: none"> ▶ North: <ul style="list-style-type: none"> ■ North Suburban to Fort Collins 	<ul style="list-style-type: none"> ■ Total Mileage- 132 ■ Capital Cost – \$9.81 B
<ul style="list-style-type: none"> ▶ Metro: <ul style="list-style-type: none"> ■ North to South Suburban via E-470 	<ul style="list-style-type: none"> ■ OPEX - \$88.2 M/yr ■ Ridership - 13.6 M/yr
<ul style="list-style-type: none"> ▶ South: <ul style="list-style-type: none"> ■ South Suburban to Briargate 	<ul style="list-style-type: none"> ■ Revenue - \$198 M/yr ■ OPEX Ratio - 2.3 ■ Sales Tax Impact (16 counties): 0.53%

IOS - ICS Conceptual **Shortfall**

Inputs	Total	Start							Finish
		2026	2035	2041	2042	2043	2044	2055	
Requirements									
CAPEX	\$9,810.0								
CAPEX Replacement - Vehicles (Yr 17 - 20)	\$280.0			\$70.0	\$70.0	\$70.0	\$70.0		
CAPEX Replacement - Systems @ 3.3% of Systems CAPEX	\$1,079.1	\$36.0	\$36.0	\$36.0	\$36.0	\$36.0	\$36.0	\$36.0	\$36.0
CAPEX Replacement - Guideway @.005% CAPEX	\$882.9	\$29.4	\$29.4	\$29.4	\$29.4	\$29.4	\$29.4	\$29.4	\$29.4
Financial Cost During Construction @5%	\$490.5								
Total CAPEX	\$12,542.5								
Funding Sources									
Federal Funding @ 50%	\$5,150.3								
Local Contributions (stations)	\$175.0								
Remaining CAPEX	\$7,217.3								
Capital Recovery	\$417.16	\$417.16	\$417.16	\$417.16	\$417.16	\$417.16	\$417.16	\$417.16	\$417.16
Income									
Fare Box	\$5,619.2	130.68	198	\$198.0	\$198.0	\$198.0	\$198.0	\$198.0	\$198.0
Ancillary Revenue @ 3% of fare box	\$178.2	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94
Less: OPEX	\$2,646.0	\$88.2	\$88.2	\$88.2	\$88.2	\$88.2	\$88.2	\$88.2	\$88.2
Net Cash	\$3,151.0	\$48.4	\$115.7						
Shortfall		-\$368.74	-\$301.42	-\$301.42	-\$301.42	-\$301.46	-\$301.46	-\$301.46	-\$301.46

IOS is best backbone as a first phase

- ▶ Meets goals of first phase to:
 - Connect to DIA
 - Be successful – have strong ridership and user satisfaction
 - Be attractive to a broad geographic spectrum of voters to support the new tax
- ▶ Most cost effective of the options considered
 - Captures 75% of the ridership of the full system (13.6 vs. 18.2 million)
 - About one-third the cost of the full system
 - Less than 40% of the total track mileage (132 vs. 340 miles)
- ▶ Connects the state's largest population centers
- ▶ Future phases (mountains, Pueblo) work better with IOS in place

Revised BCA

B/C Element	Scenario	Scenario	Scenario	Scenario	Scenario IOS for ICS
	LPA-Base	LPA-I-76	LPA-NWQ	HST Vision	FC/DIA/Briargate
Costs					
CAPEX	\$16,600,000,000	\$13,400,000,000	\$17,800,000,000	\$30,100,000,000	\$ 9,810,000,000
PW Rebuild Vehicles (Year 18)	\$ 271,480,000	\$ 190,036,000	\$ 271,480,000	\$ 351,443,200	280,000,000
PW CAPEX Replacement Systems @3.3% Systems CAPEX	1,041,860,820	841,020,180	1,117,176,060	1,889,157,270	615,702,087
CAPEX Replacement Guideway @.005%	875,392,700	706,642,300	938,674,100	1,587,308,450	517,325,445
Annual OPEX	\$ 144,000,000	\$ 120,000,000	\$ 146,000,000	\$ 198,485,000	\$ 88,000,000
OPEX Cost (30 year)	\$ 2,489,760,000	\$ 2,074,800,000	\$ 2,524,340,000	\$ 3,431,805,650	\$ 1,521,520,000
Interest payments on 50% locally funded	\$ 5,965,127,000	\$ 4,815,223,000	\$ 6,396,341,000	\$ 10,816,284,500	\$ 3,525,174,450
Finance during construction @ 5%	\$ 830,000,000	\$ 670,000,000	\$ 890,000,000	\$ 1,505,000,000	\$ 490,500,000
Total Cost	\$ 28,073,620,520	\$ 22,697,721,480	\$ 29,938,011,160	\$ 49,680,999,070	\$ 16,760,221,982
Benefits					
Calculated Benefits (PW basis)					
Increase in Real Estate Value - one time deal, no PW calc.	\$6,931,267,200	\$7,746,710,400	\$6,931,267,200	\$ 10,626,244,200	\$ 4,790,728,800
Pw of Fare Box Revenue (30 year)	\$ 5,952,543,241	\$ 6,101,534,002	\$ 5,790,455,874	\$ 5,905,455,927	\$ 3,425,783,975
PW of Ancillary Revenue	\$ 178,576,297	\$ 183,046,020	\$ 173,713,676	\$ 177,163,678	\$ 102,773,519
PW of VMT	\$ 5,328,904,037	\$ 5,204,368,863	\$ 5,095,130,196	\$ 5,104,029,000	\$ 2,970,132,038
PW of VHT	\$ 734,892,967	\$ 609,857,566	\$ 686,060,284	\$ 655,097,300	\$ 431,759,465
PW of Fatality Avoided	\$ 648,984,385	\$ 633,817,779	\$ 620,514,070	\$ 621,597,817	\$ 361,719,652
Pollution benefits	\$ 1,893,664,113	\$ 1,849,409,650	\$ 1,810,590,909	\$ 1,813,753,162	\$ 1,055,457,635
PW of Non-basic jobs (1.5 multiplier)	\$ 622,440,000	\$ 518,700,000	\$ 631,085,000	\$ 857,951,413	\$ 380,380,000
Multiplier effect of Federal funding (3.0 multiplier)	\$ 16,600,000,000	\$ 13,400,000,000	\$ 17,800,000,000	\$ 30,100,000,000	\$ 9,810,000,000
Non-basic jobs (2.0 multiplier)	\$ 4,442,658,000	\$ 3,586,242,000	\$ 4,763,814,000	\$ 8,055,663,000	\$ 2,625,450,300
Total Benefits	\$ 43,333,930,240	\$ 39,833,686,280	\$ 44,302,631,210	\$ 63,916,955,497	\$ 25,851,411,894
Sum of Benefits (PW Cost Basis)	\$ 43,333,930,240	\$ 39,833,686,280	\$ 44,302,631,210	\$ 63,916,955,497	\$ 25,851,411,894
Sum of Costs (PW Cost Basis)	\$ 28,073,620,520	\$ 22,697,721,480	\$ 29,938,011,160	\$ 49,680,999,070	\$ 16,760,221,982
B/C Ratio with Federal Funding Benefit	1.54	1.75	1.48	1.29	1.54
Operating Ratio	2.39	2.94	2.29	1.72	2.25

Engineering, Financial, and Environmental Conclusions



High-Speed Transit is Feasible and Presents Significant Statewide Benefits

- ▶ Workable alignments and rail technologies identified for both ICS and AGS
- ▶ Travel times beat automobile travel times throughout system
- ▶ Ridership of more than 18 million annually
- ▶ High level of public and community interest / enthusiasm throughout service area
- ▶ Economic benefits far outweigh costs
- ▶ Fare box covers operating costs and generates excess revenue

Some challenges remain:

- ▶ Costs are high, particularly in the mountains, and finding funding is a problem
- ▶ Environmental impacts may be an issue in urban areas (but so are benefits)
- ▶ Local politics complicate phasing priorities

What we learned – engineering...

- ▶ HSR is anticipated to cost about \$75 to \$85 million per mile (2013 \$)
- ▶ Maglev is anticipated to cost about \$90 to \$100 million per mile (2013\$)
- ▶ “Single track” for portions of the ICS system could save \$1 billion
- ▶ ICS alignments along beltways more constructible than the I-76 segment
- ▶ Moving outside the I-25 median to Fort Collins increased costs for that portion of the project
- ▶ Technologies for ICS and AGS likely different
 - Maglev technology would increase ICS costs by billions with only a marginal improvement in travel times over HSR
 - HSR is substantially more expensive in mountains due to vertical grades and tunnel requirements

What we learned –financial...

- ▶ Federal funding is a must to implement HST in Colorado
- ▶ The economics of the system are not sufficient to attract a P3 Concessionaire without significant federal and state investment
- ▶ Local match seems to make most sense for 16 counties within service area rather than statewide
- ▶ Local match would require major new source of funding, equivalent to:
 - 1.9 % sales tax for the Full Build
 - 0.53% sales tax for the IOS
- ▶ Local government contributions will optimistically be limited to covering station costs

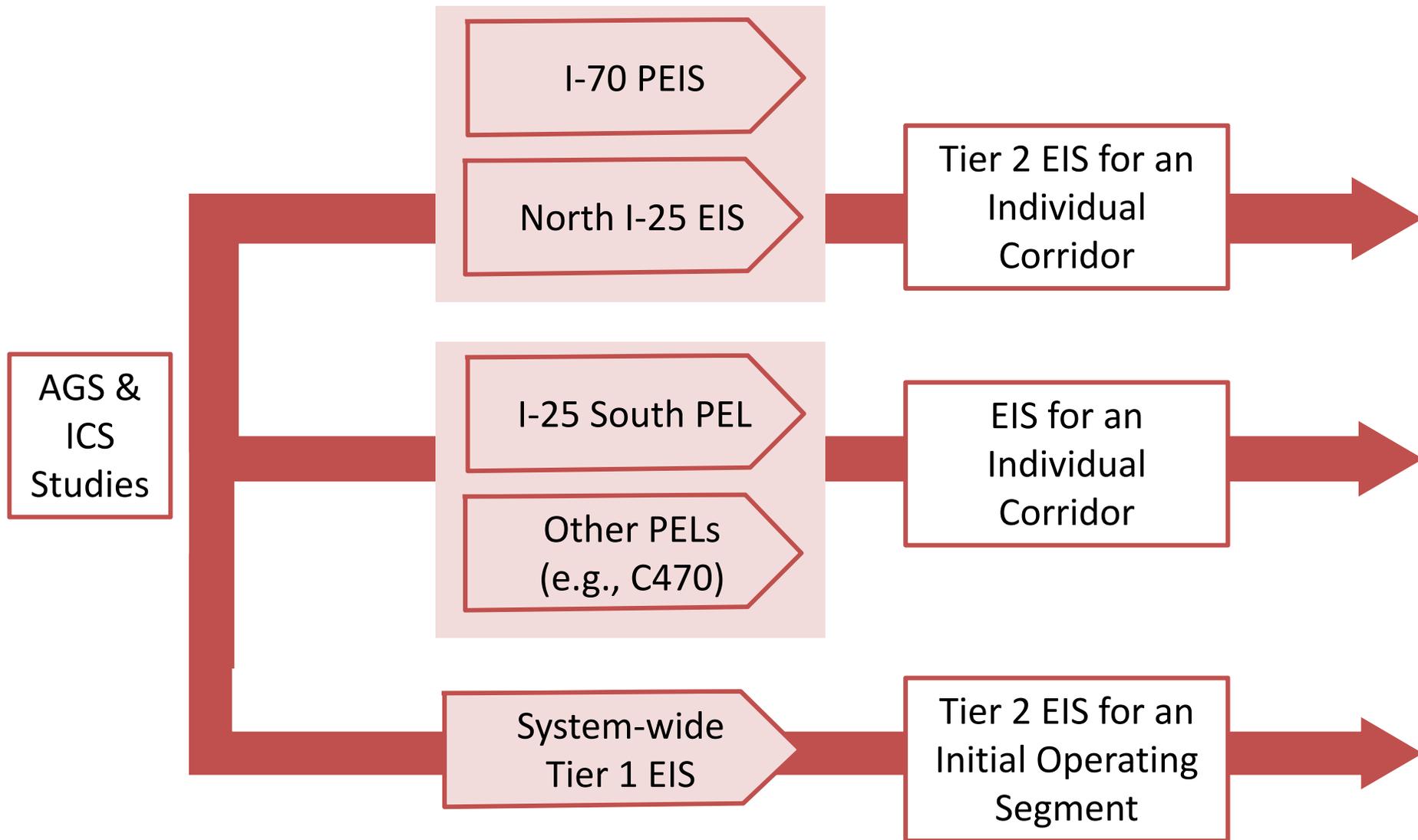
What we learned - environmental...

- ▶ Environmental impacts considered at each level of analysis
 - No environmental “show stoppers” in final recommendations
- ▶ Impacts to communities greatest in urban areas, esp. Denver and Colorado Springs
- ▶ Truncating the south alignment at Briargate significantly reduces environmental impacts in COS
- ▶ Beltway alignments in Denver area present far fewer community impacts, including historic and park impacts (Section 4(f))
- ▶ Natural resource and parkland impacts could be significant for south and mountain alignments

More Thoughts on Next Steps



Environmental Process Options



What is FRA Process?

What's the First Phase:

- Planning Phase resulting in the development of the **Passenger Rail Corridor Investment Plan (PRCIP)**
- PRCIP provides information to supports a decision to fund a major HST program
- It includes two components:
 - NEPA document
 - Service Development Plan

This is accomplished in 4 tasks:

- Task 1: Work Plan – Tasks, Budget, Schedule,
- Task 2: Preliminary Service Planning and Alternatives
- Task 3: EIS/ROD
- Task 4: Service Development Plan

What Has Been Accomplished?

Task 1	Description	Status	Needed
1	Work Plan	Complete for the Task 2	Needed for Tasks 3 and 4
2	Preliminary Service Planning &	ICS meets requirements	None additional
3	EIS/ROD	Not started	Required for Task 4
4	Service Development Plan	Not started	Required for funding

What are detailed requirements?

- ▶ Task 1 – Outlined earlier

- ▶ Task 2 – Preliminary Service Planning and Alternatives
 - Purpose and Need
 - Technical Feasibility
 - Economic Feasibility
 - Major environmental issues

- ▶ Task 3 – NEPA/ROD (Tier 1 or 2 depending on FRA consultation + based off of Task 2 above)

- ▶ Task 4 – Service Development Plan (Most of this would be done in NEPA)
 - Purpose and Need
 - Demonstration of cost-effectiveness
 - Planning methodology
 - Alternatives – including a No Action
 - Operations Modeling
 - Station Analysis
 - Demand and revenue forecasts
 - Financial performance
 - Conceptual Engineering
 - Benefit Cost Analysis

Where do we go from here?

- ▶ How can we build political support?
- ▶ Should CDOT “take the show on the road? And, if so, what are the important topics/materials to present?
- ▶ What can be done locally?
 - By CDOT?
 - By local governments?
 - By elected officials?
 - By residents?
- ▶ What can we do to build federal support / position for federal funding?

Our Conclusions Suggest HST is a Good Deal for Colorado



Overall Conclusions

- ▶ **Vision for HST is feasible**
 - Benefits far outweigh costs
 - Operations are profitable and do not require subsidy
- ▶ **High level of public and community interest / enthusiasm throughout service area**
- ▶ **Positions Colorado as a front-runner in solving 21st Century mobility challenges**
 - Travel times beat automobile travel times throughout system
 - Top tier place to live and attract economic growth
- ▶ **Initial operating system could be built with a modest (~1/2 cent) sales tax increase (with federal funding)**
- ▶ **Additional agreements and studies needed to further Vision**