



# AGS Feasibility Study

PLT Meeting 5  
August 8, 2012

# Agenda

- ▶ Introduction to the Meeting
- ▶ Public Comment
- ▶ Feasibility Discussion
- ▶ Review Revised Project Process
- ▶ Break
- ▶ Review Changes to Draft System Performance and Operational Criteria
- ▶ Update on Land Use & Station Criteria
- ▶ Presentation on Local Transit System Planning
- ▶ AGS/ICS/Co-Development Project Coordination
- ▶ Conclusion, Final Remarks and Next Steps

# Introduction to the Meeting

## ▶ Meeting Objectives

- Discuss Feasibility & Possible Ways to Determine Feasibility
- Review & Endorse Revised Project Process
- Review & Endorse Changes to Draft System Performance & Operational Criteria
- Update on Land Use & Station Criteria
- Discuss Local Transit System Planning
- Provide Update on AGS/ICS/Co-Development Project Coordination
- Discuss Next PLT Meeting

# Introduction to the Meeting

- ▶ Review and Approve Meeting Minutes from Last Meeting
- ▶ Review Action Items from Last Meeting
- ▶ Website Update
- ▶ Media Outreach

# Public Comment

- ▶ Invitation for any comments by the public



# Feasibility Discussion

- ▶ In order to attract support, the benefits of the AGS must be greater than the costs of the AGS
- ▶ Assume for time being that fare box revenue can cover O&M costs
- ▶ If benefit is not greater than cost, then system should not be built
- ▶ Benefit must be measurable and defensible
- ▶ Capital cost plus interest and ROI over time must be defined

# Feasibility Discussion

- ▶ Physical feasibility will be defined by technology analysis & alignment design
- ▶ The technology analysis & alignment design will determine the engineering solutions to make the project feasible from a construction standpoint
- ▶ The technology analysis & alignment design will also determine what is necessary for operational feasibility
- ▶ A key element of the technology analysis & alignment design will be development of an estimate of the capital costs and the operations/maintenance costs for the system

# Feasibility Discussion

- ▶ The ridership study for the system will define the amount of revenue that can be expected to be generated by the system
- ▶ The expected revenue can then be compared to the capital and operations/maintenance costs to determine if the project can exist on its own without additional funding
- ▶ All evidence to date points to the fact that the system may be able to cover the O&M costs but not the capital costs
- ▶ For that reason, additional sources of funding will be required

# Feasibility Discussion

- ▶ The length of time of the concession is important because of the cost of money associated with initial capital costs for the system
- ▶ Carrying a large amount of the capital costs over a time period results in high interest costs
- ▶ On the other hand, fare box revenue will likely hit its peak and then stay flat (or increase slightly) over time
- ▶ The same can be said for other sources of revenue, such as shared use of the guideway with utilities, rents and royalties related to development rights and other non fare box revenues

# Feasibility Discussion

- ▶ The total amount of capital costs plus interest plus a reasonable rate of return over the concession period needs to be calculated
- ▶ Through the financial task force, we will be looking at how that public funding can be raised

# Feasibility Discussion

- ▶ However, in order to justify future public funding, and prove financial feasibility, it is necessary to show that the amount of funding required is captured by the benefits accrued due to the implementation of the AGS

# Feasibility Discussion

- ▶ Measuring Benefits of AGS
  - The ridership model will be able to provide the data that will be required to calculate the cost benefits of the AGS
  - From the ridership model, the reduction in vehicle miles traveled (VMT), reductions in average daily traffic (ADT) and reductions in peak hour traffic can be determined

# Feasibility Discussion

- ▶ Measuring Benefits of AGS
  - Reduction in vehicle miles traveled (VMT), reductions in average daily traffic (ADT) and reductions in peak hour traffic can be used to directly measure benefits to include:
    - Vehicle cost reductions
    - Travel time savings
    - Safety and health benefits
    - Parking reduction
    - Congestion reduction
    - Reduction in roadway facility costs
    - Roadway land value

# Feasibility Discussion

- ▶ Measuring Benefits of AGS
  - Reduced need for traffic services
  - Value of transportation diversity
  - Reduction in air pollution
  - Reduction in highway noise
  - Reduced resource consumption
  - Land use impacts
  - Reduced water pollution and hydrologic impacts
  - Reduction in vehicle waste disposal
- Methodology exists for quantifying actual cost benefits of each of these

# Feasibility Discussion

- ▶ Seeks to get us more to the “what” of determining feasibility for three key areas:
  - Alignment
  - Technology
  - Funding/financing

# Feasibility Discussion

Criterion	Measure of Feasibility or Success	Study Level When Achieved
Technology	T1. Technology qualifications submittal. Basic performance criteria and commercial readiness.	Feasibility
	T2. Initial operations simulation based on A1 alignment and information on possible speed/time improvements	Feasibility
	T3. Refined operations simulation and technology finding. Summary of individual findings results in recommendation(s)	Feasibility
	T4. Capital Costs – conceptual estimate	Feasibility
	T5. Capital Costs – 30% design estimate	EIS
	T6. Formal vehicle requirements defined	EIS
	T7. Vehicles ordered/purchased	Implementation

# Feasibility Discussion

Criterion	Measure of Feasibility or Success	Study Level When Achieved
Alignment	A1. Vertical & horizontal curves meet speed/travel time criteria	Feasibility
	A2. Refined for speed & time	Feasibility
	A3. Refined for speed, time, & cost	Feasibility
	A4. Basic ROW ownership identification (by category)	Feasibility
	A5. Non-binding ownership commitment to acquire ROW	Feasibility
	A6. Right of way legally defined	EIS
	A7. Right of way acquired	Implementation

# Feasibility Discussion

Criterion	Measure of Feasibility or Success	Study Level When Achieved
Funding/Financing	F1. Level 2 Ridership Model Results	Feasibility
	F2. Rough order of magnitude cost estimate (full life cycle)	Feasibility
	F3. Review and estimation of percentage costs covered by various potential revenue sources	Feasibility
	F3. Analysis of likelihood of those sources to generate the revenue	Feasibility
	F4. Funding commitments to pay for EIS	Feasibility
	F5. Vote passed for local funding	EIS
	F6. Federal funding agreement signed	EIS
	F7. Investment Grade Ridership Model Results	EIS
	F8. Concession agreement created and reviewed	EIS
	F9. Concession agreement competed	Implementation
F10. Concession agreement commercial close	Implementation	

# Review Revised Project Process

- ▶ Based on feed back received from industry
- ▶ Industry has concerns about lack of definition, funding sources and long time frame
- ▶ PLT's desire to consider 21<sup>st</sup> century technologies
- ▶ Revised process was endorsed by CDOT Executive Management on August 6
- ▶ Revised process still includes industry input & collaboration

# Review Revised Project Process

- ▶ Technology Request for Information (TRFI)
  - Performance characteristics including average travel speeds and how they meet the Performance and Operational Criteria
  - Operating parameters including horizontal and vertical curvatures, station requirements, etc.
  - Travel speeds
  - Date certain on when the technology would be available to be deployed
  - Estimated costs including:
    - Capital costs on a cost/mile basis
    - Operations Costs (annual)
    - Routine Maintenance Costs (annual)
    - Major Maintenance Costs

# Review Revised Project Process

- ▶ Technology Forum
  - Invite technology providers to make presentations to PLT, CDOT, Transportation Commissioners, consultant team and interested public
  - Opportunity to ask questions of technology providers
  - Probably will be held in Golden
- ▶ Review Technology Statements of Interest
  - Conformance to Performance & Operation Criteria
- ▶ Release List of Candidate Technologies
  - For further analysis and alignment design

# Review Revised Project Process

- ▶ Alignment and Cost Development
  - Create three technology groups
  - Group 1: Those that could be constructed 100% in existing I-70 Right of Way (ROW)
  - Group 2: Those that could not probably be constructed in existing I-70 ROW (needs straight and level alignments)
  - Group 3: A hybrid of 1 & 2. Technologies that could be in I-70 ROW part of time but may need to go outside ROW in places
- ▶ AZTEC/TYPSA will develop alignments

# Review Revised Project Process

- ▶ Alignment and Cost Development
  - Develop Preliminary Alignments
  - Tunneling Analysis
  - Right of Way Analysis
  - Utility Analysis
  - Environmental Analysis
  - Travel Time/Speed Analysis
  - Ridership Modeling
  - Cost Estimating
- ▶ Final Product is Alignment Report

# Review Revised Project Process

- ▶ **Funding/Financing Strategy Development**
  - Parallel process to TRFI & Alignment Design
  - Establishes a Financial Task Force with AGS, ICS and HPTE funding/finance experts
  - Will look at a variety of strategies based on \$5, 10, \$20 and \$30 Billion Capital Costs
  - Work with PLT and I-70 Coalition to assess ways to raise public funds in corridor
- ▶ **Once Cost Estimates Are Complete**
  - Prepare assessment of potential funding gap for each technology group

# Review Revised Project Process

- ▶ Financing Request for Information
  - Submit to financial firms and concessionaires
  - Focus on the financial and organizational strategies for the deployment of the system
  - Request to provide opinions and information on:
    - Financial strategies
    - Formation of the development agreement
    - System operation and governance

# Review Revised Project Process

- ▶ AGS Feasibility Analysis
  - Identify benefits of AGS
  - Assess benefits versus capital costs
  - If benefits are greater than costs, it is a good deal for State of Colorado
- ▶ AGS Feasibility Study and Implementation Plan
  - Draft & Final Study/Plan
- ▶ Tier 2 NEPA Analysis
  - Development of alternative alignments feeds into the process
  - Through CSS/public process, preferred alternative/technology group identified

# Review Revised Project Process

- ▶ Procure Developer/Concessionaire
  - Begin near end of NEPA Analysis
  - Develop Development Agreement
  - Issue Request for Qualifications
  - Shortlist
  - Issue Request for Proposals
  - Select Developer
  - Funding and right of way in place
  - Commercial Close (September 2019)
- ▶ Begin Construction
  - Open to commercial service September 2025

# Review Revised Project Process

<b>AGS Feasibility Study - Revised Approach Draft Schedule</b>			
Activity	Duration	Start	Finish
Technical Committee Meeting	0	07/30/12	07/30/12
I-70 Committee Meeting	0	08/06/12	08/06/12
Prepare Revised Task Order 2 Scope	7	08/06/12	08/13/12
Draft Technology RFI	15	08/07/12	08/22/12
PLT Review Technology RFI	7	08/22/12	08/29/12
Final Technology RFI to CDOT	7	08/29/12	09/05/12
Advertise Technology RFI	7	09/05/12	09/12/12
Technology RFI Due	0	10/10/12	10/10/12
Technology Forum	1	10/15/12	10/16/12
Review Technology RFI's	21	10/11/12	11/01/12
Release List of Candidate Technologies	0	11/02/12	11/02/12
Alignment Design	150	11/02/12	04/01/13
Alignment To ICS for Ridership	0	05/01/13	05/01/13
Draft Financial RFI	28	02/25/13	03/25/13
Issue Financial RFI	10	03/16/13	03/26/13
Financial RFI Due	0	04/26/13	04/26/13
Feasibility Analysis	60	03/26/13	05/25/13
Draft Feasibility Study & Implementation Plan	45	05/26/13	07/10/13
Final Feasibility Study & Implementation Plan	52	07/11/13	09/01/13



# Break



# Review Changes to Draft System Performance and Operational Criteria

- ▶ General comment was to make criteria less “traincentric”
- ▶ Desire to use criteria more suited to commercial aircraft or passenger car like transport
- ▶ Clarify “shall” and “should”

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Travel Time

- The AGS should accommodate both local and express traffic simultaneously **for systems that connect to stations with vehicles that arrive/depart on scheduled basis. These systems and other system-types should be able to accommodate, at least, the peak period demands of 4,900 passengers per hour or more in the peak direction.**
- Express (**scheduled-type operations**) – AGS travel times including station dwell time should be no greater than a travel time calculated as the highway distance between the station locations divided by 65 mph.

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Travel Time

- Local (**scheduled-type operations**) – at least as fast as unimpeded vehicle on highway (including station dwell time), equivalent of existing local transit systems (Summit Stage, Eco-Transit, etc.) between local locations.
- **Other System/Operational Types** – same as Express travel time above for peak demand times and Local travel times for non-peak periods.

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Technology

- The AGS technology should be proven and available. This includes commercial availability, and/or subject to full-size independent evaluation **by the end of 2017. If safety certification or other requirements by FRA, FTA or others are necessary to be met, the technology provider should supply written evidence by the 2017 deadline that these provisions have been met.**

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Noise

- External – noise level generated by the AGS should not exceed those levels specified in the Technical Specifications of Interoperability (TSI, European Directive) Rolling Stock for those technologies **for whom these standards apply. Other technology providers should supply applicable noise standards and test data or system expectations concerning external system noise (at various anticipated system speeds).**

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Safety

- The AGS should meet the TSI criteria (at guideway) for non-compensated lateral acceleration and braking deceleration for those technologies for whom these standards apply. Other technology providers should supply applicable safety standards and test data or system expectations concerning safety. Some standards from FRA, FTA, ASCE and other sources might apply. Again, if safety certifications or other requirements by FRA, FTA or others are required to be met, the technology provider should supply written evidence by the 2017 deadline that these provisions have been met.

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Passenger Comfort

- The AGS passenger acceleration/deceleration/lateral cabin experience should conform to the requirements set forth in the European HSR Rolling Stock passenger comfort parameters/standards **for those technologies for whom these standards apply. Other technology providers should supply applicable ride comfort standards and test data or system expectations concerning passenger comfort.**

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Passenger Comfort

- The following requirements should be met:
  - Ability to have a cup of coffee on board without concern for spilling it.
  - Work on a laptop **or other electronic device**.
  - Ride comfort – ability to move around without being slammed against a wall **for those technologies that have aisles and seating rows**. Technologies that are designed to use automobile-style seating (without walkable aisles) should have ride comfort similar to auto travel. Other technologies might have other seating arrangements.

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Passenger Comfort

- The following requirements should be met:
  - Restrooms for technology systems that have cars larger than 20-passenger capacity.
  - Seating for all passengers.
  - ADA compliant (this will depend upon system and car designs although ADA compliance is required).

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Reliability

- Except for the extreme weather events to be defined by the AGS provider under the Weather **or Wind** criteria, the AGS should provide 98% on-time **operational** reliability. “On-time” is defined as within 5-minutes of the scheduled arrival or departure time. **For systems that do not propose scheduled-based service, the technology providers should supply applicable reliability standards and test data or system expectations concerning operational and maintenance reliability.**

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Headways

- The AGS headway times **should** be capable of addressing peak period demands of 4,900 passengers per hour in the peak direction. **For systems that do not propose schedule-based service, the technology providers should supply their plan for meeting or exceeding the passenger per hour minimum (above).**

# Review Changes to Draft System Performance and Operational Criteria

## ▶ Cost

- The AGS provider should provide a ~~not-to-exceed~~ **unit cost array showing costs for major system elements (e.g., guideway per mile, O&M facility, vehicles, others).** ~~along with their expected/required level of public funding participation for both capital and O&M costs.~~

# Review Changes to Draft System Performance and Operational Criteria

- ▶ Minor Changes (See Handout)
  - Shall changed to should, minor grammatical changes and changes to reflect revised approach to following criteria:
    - Special Use Vehicles
    - Footprint
    - Grade
    - Weather
    - Baggage Capacity
    - Light Freight
    - Operational Efficiencies & Maintenance Costs

# Review Changes to Draft System Performance and Operational Criteria

- ▶ Minor Changes (See Handout)
  - Shall changed to should, minor grammatical changes and changes to reflect revised approach to following criteria:
    - Context Sensitive Solutions
    - Power Generation, Transmission & Distribution
    - Energy Efficiency
    - Sustainability
    - Alignment
    - Termini
    - Potential Station Locations

# Update on Land Use & Station Criteria

- ▶ Eagle County meeting scheduled for September 4
- ▶ Still need to schedule Clear Creek County & Summit County meetings
- ▶ Discuss need for Jefferson County meeting
- ▶ Station Examples

# Presentation on Local Transit System Planning

ADVANCED GUIDEWAY SYSTEM (AGS) FEASIBILITY STUDY



# AGS/ICS/Co-Development Coordination

- ▶ ICS held 4 public meetings week of July 16
  - AGS PM attended meetings in Colorado Springs, Windsor and Golden
- ▶ AGS/ICS Project Managers regularly coordinate efforts
- ▶ AGS staff actively involved in ICS ridership model development
- ▶ Co-Development proposals are due August 15, Interviews August 30-31, Selection September 17, 2012

# Conclusions, Final Remarks & Next Steps

- ▶ Draft Technical Request for Information will be sent to PLT on August 22, 2012
- ▶ Review comments will be due August 29, 2012
- ▶ Next PLT meeting September 12, 2012
  - Feedback from county Land Use & Station Criteria meetings
  - Discuss TRFI review & scoring
  - Endorse TRFI