

CO-DEVELOPMENT, MULTI-MODAL MOUNTAIN CORRIDOR PROJECT

I-70

"Confidential"

Date: August 15, 2012

CDOT Project No. 18958



Part 1_Technical Proposal

In this issue:

The HDR Team Provides Unprecedented P3 Experience.

Leadership that will be Critical to Successfully Advancing the Program Through the Next Steps.

An Approach that Respects the I-70 Mountain CSS Principles while Focusing on Program Delivery.

HDR

CONTENTS

QUALIFICATIONS OF
KEY PERSONNEL **01**

PROJECT TECHNICAL PLAN **07**

PROJECT AND RISK
MANAGEMENT APPROACH **28**

PROJECT FINANCIAL PLAN **37**

AUGUST 15, 2012

Cover Letter

Ms. Jill Sweeney, Contracting Officer
Agreements Program
Colorado Department of Transportation
4201 East Arkansas Avenue, 4th Floor – Central
Denver, CO 80222

**RE: Co-Development, Multi-Modal, I-70 Mountain Corridor Project;
CDOT Project No. 18958**

Dear Ms. Sweeney:

Successful completion of the I-70 Mountain Corridor Project will permanently change the way that CDOT conducts business to deliver transportation mobility and access to the citizens of Colorado. After more than 50 years of building the interstate highway system primarily with federal funding, states are now becoming more and more responsible for the majority role in providing improved transportation.

CDOT is moving ahead to make this transition with projects such as U.S. 36 Phase 1 Design Build (DB) and now the Phase 2 DBF/Concession request for proposals that help define the process to partner with the private sector to accomplish common goals. HDR is the leader in helping state DOT's establish alternative delivery programs that take advantage of resources the private sector can offer. We are a part of the U.S. 36 DB team and the Eagle P3 team in Colorado, but we have also helped other transportation agencies to change the way they are doing business in states including Oregon, Utah, Texas, and California. *We are eager to assist CDOT with the I-70 Mountain Corridor.*

Our proposal advances the concepts presented in our Statement of Interest, tailored to meet the requirements in your RFP. In the pages that follow, we present an innovative, multimodal Project Plan that focuses on delivering the Minimum Program and will smoothly incorporate the AGS program if that is determined to be feasible. Our approach establishes a delivery process to attract and secure a P3 concessionaire that will implement a staged series of improvements to complete the Minimum Program by 2022.

The results of the financial evaluation completed by our team for this proposal demonstrates that our Project Plan concept will be supported by user-fee revenues with no additional funding required from CDOT or local sources. Improvements at gateway locations along I-70, coupled with charging users for the improved mobility at those locations, generates more than enough revenue to meet FHWA requirements to adequately fund construction, operations, debt service, and capital recovery.

Considering these findings, we are confident that the procurement process we design and conduct will result in successful negotiation and financial close with a private-sector concessionaire in 20 months from notice to proceed. Critical to this schedule will be the understanding and support of the program from CDOT, FHWA, and the broad

span of stakeholders and interest groups across our state. Changing to a user-fee corridor will be a dramatic change for all users. The transition will be effectively managed and advanced in close coordination with FHWA and stakeholders because we will only get one chance to get it right. Our approach addresses the high level of process-risk by continuing to engage the CSS for input as the program is developed. We are proposing a series of practical, staged improvements with an Adaptive Management approach to incorporate major elements such as AGS as other decisions are made by CDOT.

The pages that follow are presented using the format outlined in your RFP. We have deliberately written our proposal using terms we all can understand rather than technical jargon from experts. If we cannot communicate the concepts here, we will never be able to do so with the general public.

Thank you for the opportunity to submit our Proposal. We look forward to our interview on August 30, 2012. Please contact me, your single point of contact, with any questions via phone at (720) 369-9446 or via email at rick.pilgrim@hdrinc.com.

Sincerely,

HDR Engineering, Inc.



Rick Pilgrim, PE: *Project Manager, Vice President*

The HDR team is the best fit as your Co-Developer for the following reasons:

- 1** Our team includes HDR serving as Prime supported by Hatch Mott MacDonald, Steer Davies Gleave, Goldman-Sachs, and Icenogle Seaver Pogue in key roles. Our personnel have the hands-on experience of helping more than 80 public transportation agencies complete more than 150 alternative delivery and P3 projects across North America and overseas. No single team has as much relevant experience with demonstrated successes in this emerging field.
- 2** Our managers are senior level professionals with proven experience in helping CDOT and other transportation agencies to advance complex projects. Rick Pilgrim, Gina McAfee, Steve Long, and Amy Kennedy have all helped CDOT complete major projects. Doug Jackson, Kern Jacobson, Garey Foyt, Ken Smith, and Mike Schneider have completed major assignments for transportation agencies that have resulted in more than \$10 billion in construction over the last five years.
- 3** We have fully integrated the CSS process into our Project Plan. We recognize the importance of continuing productive engagement with stakeholders and the keys to approval that each holds. We will actively focus public involvement to achieve program delivery.
- 4** This program will be seen as revolutionary. This “out-of-the-box” thinking will be balanced with the practical reality demanded by conditions in the I-70 Mountain Corridor. A practical Project Plan is the only way to attract private sector participation.
- 5** Participants at all levels will perceive uncertainty about the approach and the Project Plan. As your Co-Developer, we will employ a risk management culture that identifies and addresses problems before they occur. As your partners, we are as invested as you are in successful completion of improvements to this critically important Corridor.

FORM B
RECEIPT OF ADDENDA/CLARIFICATIONS

Submitter's Name: HDR Engineering, Inc.

The Undersigned Acknowledges receipt of the addenda to the RFP as indicated below.

ADDENDA

Addendum/Clarifications No. Final Revised RFP Dated 7/26/2012

Addendum/Clarifications No. RFP Q&A Dated 7/27/2012

Addendum/Clarifications No. Email Dated 8/13/2012

Addendum/Clarifications No. _____ Dated _____

Addendum/Clarifications No. _____ Dated _____

Addendum/Clarifications No. _____ Dated _____

Failure to acknowledge receipt of all addenda may cause the RFP to be considered non-responsive to the solicitation. Acknowledged receipt of each addendum must be clearly established and included with responses to the RFP.

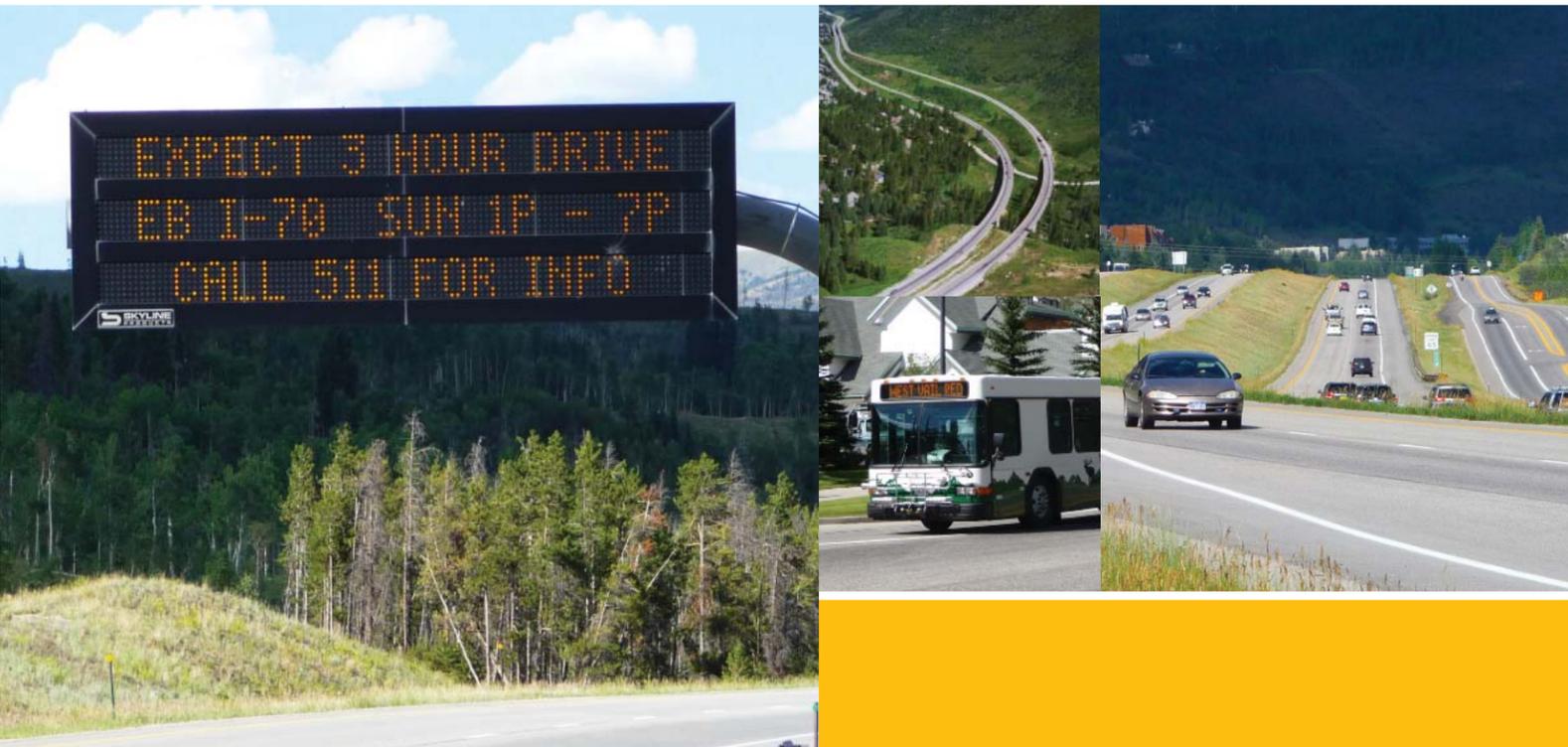
By:  Print Name: Rick Pilgrim

Title: Vice President Date: August 15, 2012

6.1

QUALIFICATIONS OF KEY PERSONNEL

6.1 QUALIFICATIONS OF
KEY PERSONNEL



6.0 Introduction and Overview to HDR Team

Why is HDR the Best Fit for CDOT?

HDR is the industry leader in alternative delivery implementation for transportation improvements. We have extensive experience in guiding agencies through funding program decisions. This introduction provides an overview of the HDR team approach to delivering the I-70 Mountain Corridor program of improvements. Our approach matches the requirements in the Record of Decision (ROD) and is consistent with the philosophy of a series of phased improvements over time.

Implementing the HDR team approach will result in the establishment and operation of a user-fee corridor for travel along I-70 from C-470 to the Eagle County Airport. Our approach will apply the Context Sensitive Solutions (CSS) process for the Corridor along with the principles of adaptive management to make the transportation improvements that are so critically needed.

Prime Objective

Nothing will be improved in the Corridor without funding. Our approach will procure and close a contract with a concessionaire to implement a series of improvements that are the major portion of the Minimum Program of Improvements. We will procure the concessionaire in the first 20 months of the program. The concession agreement will require the implementation of Base improvements, Core improvements, and Optional improvements over a 10- to 15-year period.

THE HDR TEAM WILL PROVIDE CDOT AND HPTC WITH “OUT-OF-THE-BOX” THINKING BALANCED WITH PRACTICAL SOLUTIONS.

1 Goldman-Sachs (GS) provides unmatched P3 financial advisory services and served as the P3 advisor for the Eagle P3 Project; they know Colorado’s opportunities and constraints from a financial perspective. Similarly, Icenogle-Seaver-Pogue (ISP) is based in Colorado and has the most extensive and long-standing legal experience with alternative delivery programs including E-470, Northwest Parkway, Jefferson Parkway, and now the C-470 Coalition.

A RISK MANAGEMENT APPROACH THAT AVOIDS ESCALATION OF COST THROUGH DELAYS OR OTHER IMPACTS.

2 Our approach has been tested and employed on 150 similar programs. On the \$4.65 billion SR 520 Bridge Replacement and HOV Program, the Cost Risk Analysis + Value Engineering™ (CRAVE™) process resulted in a program savings of approx. \$250M.

AN APPROACH THAT RESPECTS CSS PRINCIPLES WHILE ACTIVELY FOCUSING ON DELIVERY.

3 Amy Kennedy’s involvement in developing the CSS Guidance and her role leading the PEIS PLT, coupled with Gina McAfee’s current experience implementing the Guidance on the Twin Tunnels, will result in the successful application of CSS to move the program forward.

THE HDR TEAM BRINGS UNPRECEDENTED P3 EXPERIENCE.

4 HDR’s experience includes more than 150 projects that helped 80 different clients procure, negotiate, and implement P3 and concession contracts. We know the pitfalls and successes of alternative delivery programs and will bring that knowledge to you.

OUR MANAGERS PROVIDE STRONG LEADERSHIP.

5 Rick Pilgrim brings 35 years of experience managing large programs in Colorado, including as project manager for the Basic Engineering/EIS/ROD on the CDOT/RTD US 36 Corridor. Gina McAfee worked on the original I-70 Mountain Corridor Collaborative Effort Team, the PEIS Rewrite Team, the I-70 Coalition Land Use Study, the AGS Feasibility Study, and the Twin Tunnels EA. Doug Jackson is completing the I-15 CORE DB project for UDOT. Garey Foyt is the lead procurement specialist on the North Tarrant Expressway project for TxDOT. Kern Jacobson is leading LAMTA, a \$35B program using alternative delivery and finance techniques.



Depending upon the results of ongoing studies, the concession agreement will provide an option to participate in the AGS program as well. Our approach also provides a back-up plan in the event that it is not possible to reach an agreement with a concessionaire. The alternative plan would establish the user-fee corridor using a more traditional public-sector based approach led by CDOT and the High Performance Transportation Enterprise (HPTE).

We will begin consultation with FHWA to gain their concurrence on the program as soon as the project starts. FHWA concurrence must be obtained to allow the program to move forward. This includes agreement on the user-fee strategy and governance structure of the bus transit component as well as the approach to how a concessionaire may be contracted with to fund program.

Program Guidelines will also be drafted in close coordination with CDOT and FHWA. They will provide the framework for all Tier II NEPA studies, design, construction, and operation of the improvements. The guidelines will identify the sequence of tasks, key decision points, and team roles and responsibilities. It will be broken down within each phase to capture the specific needs of that phase for agencies, stakeholders, and the co-development team. The Guidelines will be a living document throughout the entirety of the program.

6.1_Qualifications of Key Personnel

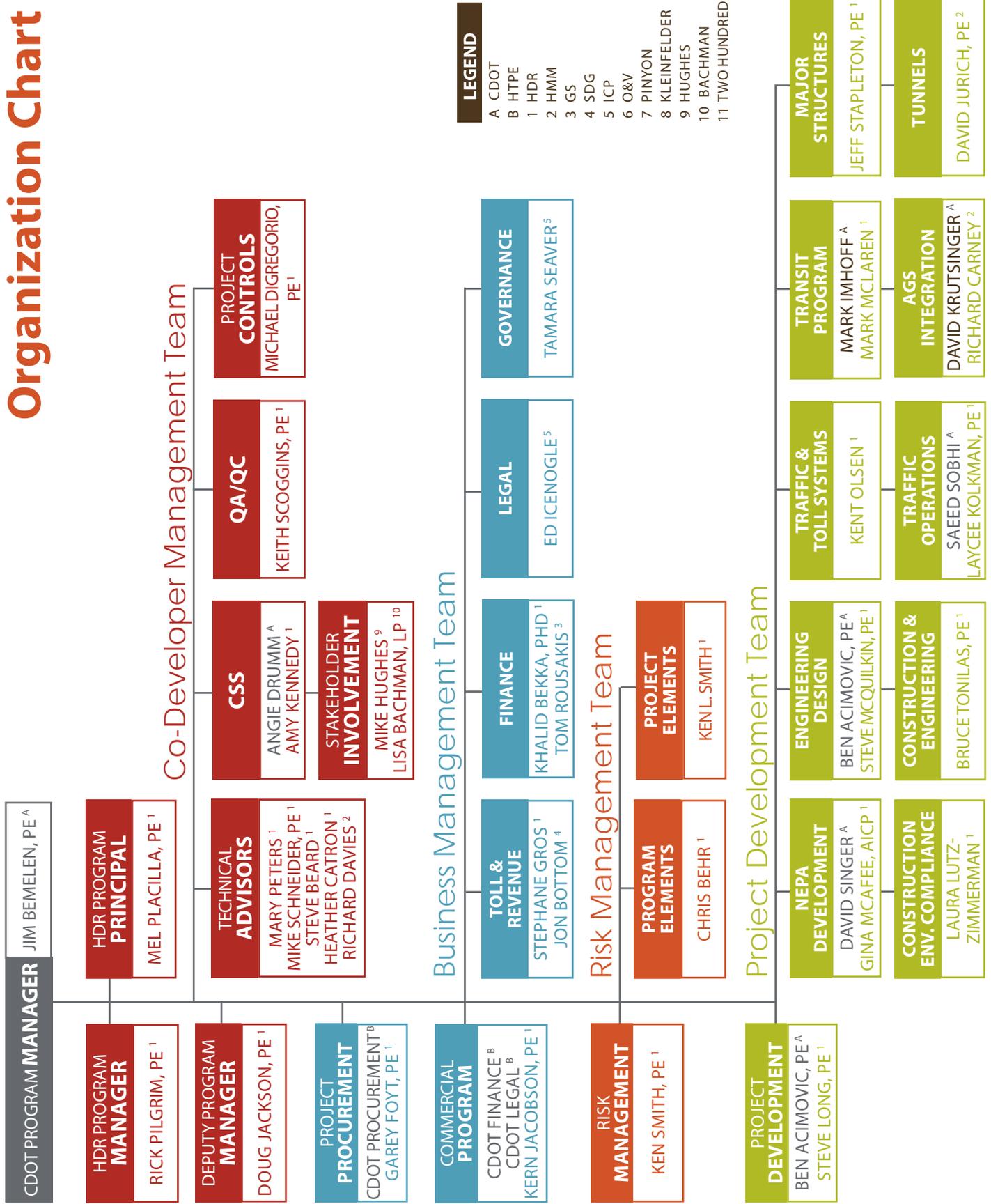
HDR is eager to partner with CDOT to successfully deliver an improved I-70 Mountain Corridor. Our team will employ a management process to help CDOT deliver a successful project. Our key personnel, highlighted below, are senior leaders with extensive experience in project development and alternative delivery programs.

Our team organization chart on the next page represents the flow of our team, aligned with the organization of CDOT and of HPTE. We expect that resources from both sides will be needed to successfully deliver the I-70 Mountain program. Table 1 highlights our team background and expertise.

Our team includes nationally recognized experts in the transportation industry.



Organization Chart



LEGEND

- A CDOT
- B HTPE
- 1 HDR
- 2 HMM
- 3 GS
- 4 SDG
- 5 ICP
- 6 O&V
- 7 PINYON
- 8 KLEINFELDER
- 9 HUGHES
- 10 BACHMAN
- 11 TWO HUNDRED

Table 1_Team Background and Expertise

Background						Experience								
Name	Role	Firm	Years of Exp.	Education	Licenses	Highway & Tunnel Design	Construction & O&M	Transit Design & Operations	Traffic & Revenue Analyses	EIS Development & Clearances	Tolling & Market Strategies	Stakeholder Outreach	Alternative Finance Options	P3 Concession Procurement
PM	Rick Pilgrim, PE	Program Manager	HDR Engineering, Inc	34	BS, Civil Engineering	PE (CO)	X	X	X	X	X	X	X	X
	Mel Placilla, PE	Project Principal	HDR Engineering, Inc	40	BS, Civil Engineering	PE (CA)	X	X	X	X	X	X	X	X
	Doug Jackson, PE	Deputy Program Mgr.	HDR Engineering, Inc	18	BS, Civil Engineering	PE (SD)	X	X	X	X	X	X	X	X
ADVISORS	Mary Peters	Technical Advisor	HDR Engineering, Inc	25	BS, Business Mgmt	--	X	X	X	X	X	X	X	X
	Mike Schneider	Technical Advisor	HDR I InfraConsult, Inc.	37	MA, Planning	--	X	X	X	X	X	X	X	X
	Steve Beard	Technical Advisor	HDR Engineering, Inc	37	MS, Planning	--	X	X	X	X	X	X	X	X
	Heather Catron	Technical Advisor	HDR Engineering, Inc.	21	BS, Program Delivery	--	X	X	X	X	X	X	X	X
	Richard Davies	Technical Advisor	Hatch Mott MacDonald	43	BS, Civil Engineering	Charter Eng.	X	X	X	X	X	X	X	X
CSS	Amy Kennedy	CSS/Public Involvement	HDR Engineering, Inc	15	MS, Env. Sciences	--	X	X	X	X	X	X	X	X
	Mike Hughes	CSS/Public Involvement	Hughes Collaboration	27	MA, City Planning	--	X	X	X	X	X	X	X	X
	Lisa Bachman	CSS/Public Involvement	Bachman Group	36	BA, Communications	--	X	X	X	X	X	X	X	X
PROGRAM MANAGEMENT	Kern Jacobson, PE	Commercial Program	HDR I InfraConsult	38	MS, Civil Engineering	PE (CO)	X	X	X	X	X	X	X	X
	Garey Foyt, PE	Project Procurements	HDR Engineering, Inc	36	MS, Civil Engineering	PE (TX)	X	X	X	X	X	X	X	X
	Stephane Gros	Toll & Revenue	HDR Engineering, Inc.	18	PhD, Economics	--	X	X	X	X	X	X	X	X
	Jon Bottom	Toll & Revenue	Steer Davies Gleave	31	PhD, Transportation	--	X	X	X	X	X	X	X	X
	Khalid Bekka	Finance	HDR Engineering, Inc	22	PhD, Economics	--	X	X	X	X	X	X	X	X
	Tom Rousakis	Finance	Goldman Sachs	15	--	--	X	X	X	X	X	X	X	X
	Edward Icenogle	Legal	Icenogle, Seaver, Pogue	34	JD, Law	Lawyer (CO)	X	X	X	X	X	X	X	X
	Tamara Seaver	Governance	Icenogle, Seaver, Pogue	13	JD, Law	Lawyer (CO)	X	X	X	X	X	X	X	X
RISK	Ken Smith, PE	Risk Management	HDR Engineering, Inc	33	BS, Civil Engineering	PE (CA)	X	X	X	X	X	X	X	X
	Chris Behr	Program Elements	HDR Engineering, Inc.	18	MS, Civil Engineering	LEED AP	X	X	X	X	X	X	X	X
	Ken L. Smith	Project Elements	HDR Engineering, Inc.	31	--	PE (WA); CVS	X	X	X	X	X	X	X	X
PROJECT DEVELOPMENT	Steve Long, PE	Project Development	HDR Engineering, Inc	29	BS, Civil Engineering	PE (CO)	X	X	X	X	X	X	X	X
	Gina McAfee, AICP	NEPA Development	HDR Engineering, Inc	35	BS, Landscape Arch.	AICP	X	X	X	X	X	X	X	X
	Steve McQuilkin, PE	Engineering Design	HDR Engineering, Inc	30	MS, Civil Engineering	PE (CO)	X	X	X	X	X	X	X	X
	Bruce Tonilas, PE	Construction/Engineering	HDR Engineering, Inc.	29	MS, Civil Engineering	PE (CO)	X	X	X	X	X	X	X	X
	Kent Olsen, PE	Traffic & Toll Systems	HDR I Infra Consult	45	MS, Transportation	PE (CA)	X	X	X	X	X	X	X	X
	Mark McLaren	Transit Program	HDR Engineering, Inc	14	BS, Landscape Arch.	RLA	X	X	X	X	X	X	X	X
	Jeff Stapleton, PE	Major Structures	HDR Engineering, Inc.	34	MS, Civil Engineering	PE (CO)	X	X	X	X	X	X	X	X
	David Jurich, PE	Tunnels	Hatch Mott MacDonald	32	MS, Civil Engineering	PE (CO)	X	X	X	X	X	X	X	X
	Laycee Kolkman, PE, PTOE	Traffic Operations	HDR Engineering, Inc	12	MS, Civil Engineering	PE (CO); PTOE	X	X	X	X	X	X	X	X
	Richard Carney	AGS Integration	Hatch Mott MacDonald	21	MS, Rail Systems Eng.	Charter Eng.	X	X	X	X	X	X	X	X

Colorado and P3 Projects

HDR leads a team that has been successfully serving Colorado clients for 50 years. Representative projects are listed in Table 2, while Table 3 provides a snapshot of HDR’s P3 experience.

HDR has assisted more than **80** public agencies in the U.S. with P3 projects.

Table 2_Experience of Key Personnel on Colorado Projects

Name	Description	Key Personnel
I-70 MOUNTAIN CORRIDOR	 <p>HDR Team members are intimately familiar with the I-70 Mountain Corridor and its approaches. Key task leads have been directly involved in environmental studies and NEPA Tier II projects. Our staff have aided in the development of CSS and have applied it successfully to projects in the Corridor, and have worked on the EJMT for years. Specifically, Amy Kennedy worked on the PEIS and CSS as did Gina McAfee, who also served as the deputy project manager on the Twin Tunnels EA and provided support on the Frontage Road project.</p>	<ul style="list-style-type: none"> ■ Dave Jurich ■ Mike Hughes ■ Amy Kennedy ■ Steve Long ■ Gina McAfee ■ Steve McQuilkin ■ Scott Epstein
EABLE P3 COMMUTER RAIL	 <p>The RTD is currently undertaking this FasTracks, multi-billion dollar program. The Eagle P3 Commuter Rail project, part of the program, will be the Denver metro area’s first commuter rail project and will connect downtown’s Denver Union Station with Denver International Airport (DIA). Developed through a P3, it includes a 23.6-mile-long commuter rail line from DIA to Union Station; a new 11.2-mile commuter rail line from Union Station to Wheat Ridge; a two-mile initial segment of the Northwest Rail Corridor; and a new commuter rail maintenance facility. HDR is part of the joint-venture team of Denver Transit Partners implementing the P3 Contract.</p>	<ul style="list-style-type: none"> ■ Laycee Kolkman ■ Gina McAfee ■ Steve McQuilkin ■ Rick Pilgrim ■ Jeff Stapleton ■ Scott Epstein
US 36 MANAGED LANES	 <p>CDOT selected the Ames/Granite Joint Venture team, for which HDR is the designer, as the DB contractor of the U.S. 36 Express Lanes project. The \$310 million project is led by CDOT, the Colorado HPTe and the RTD. The project is reconstructing the existing U.S. 36 pavement and widening the highway to add one managed lane in each direction. It also includes other transportation improvements from Federal Boulevard past the Interlocken Loop interchange along U.S. 36. This is the first project in Colorado to build infrastructure to support four different modes of travel: BRT, HOV, tolled express lanes and a separated commuter bikeway alongside the highway. Rick Pilgrim served as the consultant PM and Gina McAfee was the RTD PM who completed the EIS/ROD and Basic Engineering for the Corridor.</p>	<ul style="list-style-type: none"> ■ Steve Long ■ Gina McAfee ■ Rick Pilgrim ■ Scott Epstein

Table 3_Experience of Key Personnel on P3 Projects

Name	Description	Key Personnel
OREGON BRIDGE DELIVERY PROGRAM	 <p>The Oregon Bridge Delivery Program (ODBP), a 50/50 Joint Venture Corporation, teamed HDR and Fluor Enterprises in providing program management, construction management and engineering oversight services for the Oregon Transportation Investment Act (OTIA) III State Bridge Delivery Program.</p> <p>Beginning in 2004, the \$1.3 billion program replaced or repaired approximately 400 bridges on state highways. Additional program goals included using efficient and cost-effective delivery methods to keep traffic moving and minimize impacts on industry and the traveling public; maintaining freedom of freight movement to ensure timely product delivery throughout the state; building projects that are sensitive to communities and the environment; and helping ODOT capitalize on funding opportunities.</p>	<ul style="list-style-type: none"> ■ Heather Catron ■ Garey Foyt ■ Doug Jackson ■ Steve Long ■ Mel Placilla ■ Keith Scroggins
NORTH TARRANT EXPRESSWAY	 <p>The North Tarrant Express (NTE) project consists of a series of major highway improvements to the critical I-820 and S.H.121/183 (Airport Freeway) corridor between I-35 West and Industrial Boulevard in North Tarrant County. When complete, the project will provide eight to ten lanes on Interstate 820 (I-820) and S.H. 121 and S.H. 183. The project will improve mobility by almost doubling the existing road capacity with a combination of general purpose lanes and continuous frontage roads, along with managed toll lanes.</p> <p>As a P3, the project leverages a \$573 million TxDOT investment into a \$2.5 billion project that reaches from north Fort Worth to near D/FW Airport. Construction began in late 2010 and is on fast track for completion by 2015. HDR has served in two roles on the project, including Procurement Engineer and GEC Transition Team Lead. HMM is providing Technical Support and T&R Advisement to P3 Sponsor.</p>	<ul style="list-style-type: none"> ■ Khalid Bekka ■ Garey Foyt ■ Mel Placilla
LAMTA P3 PROGRAM	<p>HDR I InfraConsult is currently prime contractor for an international consortium to develop and implement Los Angeles County Metropolitan Transportation Authority's (Metro's) new P3 Program, using alternative methods for funding, financing and delivering the \$35 billion program. Metro is moving forward with six projects totaling more than \$2.6 billion in the program developed by HDR I InfraConsult.</p>	<ul style="list-style-type: none"> ■ JD Douglas ■ Kern Jacobson ■ Kent Olsen ■ Mel Placilla ■ Mike Schneider

Form A

KEY PERSONNEL RESUMES



CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Rick Pilgrim, PE	VP, Transportation Market Sector Director
PROJECT ROLE	YEARS EXPERIENCE
Program Manager	<i>With this firm:</i> 1 Year
<i>Firm name:</i> HDR, Inc.	<i>With other firms:</i> 33 Years
<i>Location:</i> Denver, CO	<i>In role as stated in letter "b":</i> 8 Years
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution:</i> Colorado State University	<i>Educational Institution:</i>
<i>Degree:</i> Bachelor of Science	<i>Degree:</i>
<i>Year:</i> 1977	<i>Year:</i>
<i>Specialization:</i> Civil Engineering	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i> 1984	
<i>Discipline:</i> Professional Civil Engineer	
<i>Location of Registration:</i> Colorado	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Rick has more than 34 years of experience as a nationally recognized expert in helping state DOTs and local and regional agencies find solutions to congested travel corridors. Project experience includes work for lead agencies to meet requirements of FRA, FTA and FHWA in cities such as Austin, Dallas, Denver, Los Angeles, Las Vegas, Phoenix, Salt Lake City and San Diego.

Rick has been responsible for completion of the work on more than 25 major corridors, directing staff on tasks involving transportation planning and design, environmental clearance, travel demand forecasting and implementation programming. ***For eight years he served as the General Planning Consultant's program manager for Dallas Area Rapid Transit, helping to program more than \$1.5 billion in new construction*** that is now largely completed. His relevant project experience includes:

- **U.S. 36 Environmental Impact Statement/Basic Engineering, Denver, CO:** Project manager for analysis of improvements to U.S. 36 from I-25 to Boulder, CO. Rick played a critical role in the new highway lanes, HOV lanes, express/toll lanes, BRT and commuter rail service. He led coordination with six municipalities and two counties. He also led management coordination with a joint FTA, FHWA, CDOT and RTD management team. The project is now under construction to Interlochen Drive as a DB project by Ames/Granite with HDR as the designers. A second phase is out for bid to attract a P3 concession or DB-Finance partner, and HDR is part of the Ames/Granite team proposing to complete that work.
- **Northwest Commuter Rail Line Environmental Clearance and Preliminary Design, Denver-Boulder-Longmont, CO:** Project manager/principal-in-charge for the 43-mile commuter rail project to share tracks with the BNSF freight service. His role was to oversee planning, design and environmental studies and documentation. He led tasks that included interface and coordination with local jurisdictions and regulatory agencies, including FTA, FHWA and FRA.

Rick Pilgrim, PE (Continued)

- **I-15 North Major Investment Study and Draft EIS, Salt Lake City, UT:** Managed preparation of MIS and DEIS for improvements to I-15 north of Salt Lake City. Rick developed the “shared solution” concept to demonstrate need for improvements to I-15, addition of a new parallel highway, and a major commuter rail transit component.
- **DART General Planning Consultant, TX:** Overall Program Manager for two-, four-year contract assignments to plan, design and obtain environmental approvals for rail extensions to Garland, Farmer’s Branch/Carrollton and DFW Airport. The value of construction was over \$1.5 billion. Each of the rail lines is constructed and open to service except for the line to DFW, which will open in 2013.
- **I-5/Mid-Coast Corridor Alternatives Analysis/Draft Environmental Impact Statement, San Diego, CA:** Managed the preparation of the FTA Alternatives Analysis that included adding HOV lanes to I-5, commuter rail along the BNSF, and LRT extension to the San Diego system. He also managed preparation of the Draft EIS and led all public participation and agency coordination.
- **S.R. 52 Route Location and Preliminary Design/NEPA Evaluation, San Diego, CA:** Project manager for 14-mile extension of urban freeway along new alignment through rolling terrain. Work included development of project justification, conceptual and preliminary engineering, NEPA screening evaluation and public involvement. The project worked interactively with stakeholders and residents to achieve a compatible location and design concept. The highway is now constructed and open to traffic.
- **Fresno-Palmdale Segment, California High-Speed AA/EIS, CA:** Senior planning manager for project to advance from Tier 1 ROD to detailed alternatives analysis and identification of preferred alignment for completion of Tier 2 EIS.
- **Commuter Rail System Plan and Corridor Development Plans (CDP) for Phoenix Region, AZ:** Project manager for developing regional Commuter Rail System Plan and two Corridor Development Plans to take advantage of existing BNSF and UPRR freight railroad lines to provide service to the expanding Greater Phoenix region.
- **I-10/Exposition Corridor Alternatives Analysis/ Environmental Assessment, Los Angeles, CA:** Project manager for assessment of the former Southern Pacific rail line which was designed to connect downtown Los Angeles with Santa Monica. He was part of the development of the conceptual plans and identified preferred alternative as well as conducted agency and public meetings. The line is now under construction using DB delivery approach.
- **North Metro Basic Engineering/Environmental Impact Statement/Record of Decision, Denver Region, CO:** Served as the principal-in-charge of this FasTracks project with oversight and administration of planning, design and environmental studies and documentation. Rick was instrumental working with project staff on coordination with local jurisdictions and regulatory agencies.
- **Central Platte Valley LRT Environmental Assessment/Preliminary Engineering/Final Design, Denver, CO:** Project Manager. Managed preparation of Environmental Assessment and Finding of No Significant Impact in 11 months. Co-managed with RTD staff the preliminary engineering, final design and construction. This line opened in 2002.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Doug Jackson, PE	Transportation Project Lead
PROJECT ROLE	YEARS EXPERIENCE
Project Development	<i>With this firm:</i> 12 Years
<i>Firm name:</i> HDR, Inc.	<i>With other firms:</i> 6 Years
<i>Location:</i> Salt Lake City, UT	<i>In role as stated in letter "b":</i> 11 Years
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution:</i> South Dakota State Univ.	<i>Educational Institution:</i>
<i>Degree:</i> Bachelor of Science	<i>Degree:</i>
<i>Year:</i> 1994	<i>Year:</i>
<i>Specialization:</i> Civil Engineering	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i> 1999	
<i>Discipline:</i> Professional Civil Engineer	
<i>Location of Registration:</i> South Dakota, Minnesota	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Doug has 18 years of transportation engineering and construction management experience. He has spent the last **11 years managing alternative delivery projects for state transportation agencies and private owners**. He has outstanding knowledge of the alternative delivery process from both the owner and contractor's point of view, which contributes to his skill as a facilitator among the entire project team. He is an expert in developing P3 alternative delivery criteria, requests for qualifications and requests for proposals, and in administering DB, CM/GC, and P3 contracts through design and construction. His specific project experience includes:

- **Mountain View Corridor Program Management, UDOT, UT:** Project Manager for 35 miles of P3 planned freeway, transit, and trail system in western Salt Lake and northwestern Utah counties that crosses 13 municipalities.
- **T.H. 52 Highway Reconstruction, MnDOT, Rochester, MN:** Served as HDR's Project Manager and a member of Mn/DOT's project management team during the construction and design of this \$232 million P3 reconstruction project.
- **Glenn-Parks Interchange Project, Alaska Department of Transportation and Public Facilities, Anchorage, AK:** Program developer and engineer for this \$50M DB project.
- **I-229 Reconstruction Design-Build Program Management, South Dakota Department of Transportation, Sioux Falls, SD:** Served as lead project manager for the reconstruction of 6.7 miles of urban interstate, reconstruction of two 430-foot bridges, and the addition of auxiliary lanes between interchanges, with a total project cost of \$32.5 million.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Mel Placilla, PE	Professional Services Director
PROJECT ROLE	YEARS EXPERIENCE
Principal-in-Charge	<i>With this firm: 11 Years</i>
<i>Firm name: HDR, Inc.</i>	<i>With other firms: 29 Years</i>
<i>Location: Orange County, CA</i>	<i>In role as stated in letter "b": 11 Years</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: Rensselaer Polytechn.Inst.</i>	<i>Educational Institution:</i>
<i>Degree: Bachelor of Science</i>	<i>Degree:</i>
<i>Year: 1972</i>	<i>Year:</i>
<i>Specialization: Civil Engineering</i>	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered: 1978</i>	
<i>Discipline: Professional Civil Engineer</i>	
<i>Location of Registration: California, Michigan, Texas</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Mel's 40-year career includes extensive experience in the development of complex infrastructure projects from concept development, funding, planning, and environmental clearance, through design, construction, and operations. *Many of the projects Mel has led have required extensive consensus-building with stakeholder groups and agencies and have involved major public outreach efforts.* He has assisted in the development of strategies for P3 projects in Arizona, Indiana, Pennsylvania, Alaska, and California. He worked on the developer team to assess feasibility and develop projects in California, Arizona, and Washington. His relevant experience includes:

- **Eagle P3 Project, Denver, CO:** Project executive for DBFOM, which will extend commuter rail from the Denver city center on three new lines to multiple suburban locations and the Denver International Airport.
- **I-15 CORE, UDOT, Salt Lake City, UT:** Project executive for the DB team for this \$1.7B project that extends over a 23.5-mile stretch of the major north-south commuter route between Salt Lake City and the Provo/Orem region of Utah County. The project is rebuilding and reconfiguring 10 freeway interchanges and replacing and restoring 55 bridges.
- **I-69 TPA Project, INDOT, IN:** Technical advisor provided services to determine the feasibility of new toll facility in southern Indiana. Services included financial feasibility, risk assessment, capital and operating cost estimates, and preliminary engineering as well as leading public outreach.
- **P3 Program Management, ADOT, AZ:** Advisor over the last two years assisting in developing project strategy and reviewing feasibility of potential P3 highway projects.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Mary Peters	Consultant
PROJECT ROLE	YEARS EXPERIENCE
Senior Technical Advisor	<i>With this firm: 2</i>
<i>Firm name: Mary Peters Consulting Group, LLC</i>	<i>With other firms: 23</i>
<i>Location: Phoenix, AZ</i>	<i>In role as stated in letter "b": 15</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: University of Phoenix</i>	<i>Educational Institution:</i>
<i>Degree: Bachelor of Science</i>	<i>Degree:</i>
<i>Year: N/A</i>	<i>Year:</i>
<i>Specialization: Management</i>	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i>	
<i>Discipline:</i>	
<i>Location of Registration:</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Over her 25 years in transportation, Ms. Peters has earned a solid reputation as an innovative problem solver. Before Mary Peters' tenure as U.S. Transportation Secretary (2006-2009), the concept of P3s was an afterthought. Very few talked about the possibilities, and private investment in public infrastructure wasn't a mainstream concept. She effectively advanced the need for new thinking about how to pay for and operate projects and is widely credited for getting the subject of P3s a permanent seat at the domestic policy table.

Prior to serving as U.S. Secretary of Transportation, Ms. Peters was a senior vice president and national director for transportation policy and consulting for HDR. From 2001-2005, Ms. Peters served as the Federal Highway Administrator for the U.S. Department of Transportation. In that position, she had responsibility for the federal-aid and federal lands highway programs, including the interstate highway system and the national highway system.

As FHWA Administrator, Ms. Peters placed special emphasis on finding new ways to invest in road and bridge construction, including innovative P3 to build roads faster and at less public expense. She was a strong advocate for using new technology to reduce construction time, saving taxpayers money and resulting in safer, longer-lasting roads and highways.

Ms. Peters served as the director of the Arizona Department of Transportation prior to becoming Federal Highway Administrator. She led efforts to significantly accelerate completion of the Maricopa County Regional Freeway System, building the first large interstate DB project in Arizona.

She is currently the principal of Mary E. Peters Consulting Group, LLC, an organization dedicated to finding new and better ways to address America's infrastructure requirements.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project	
NAME	TITLE
Mike Schneider	Principal Consultant
PROJECT ROLE	YEARS EXPERIENCE
Senior Technical Advisor	<i>With this firm: 6 Years</i>
<i>Firm name: HDR InfraConsult</i>	<i>With other firms: 31 Years</i>
<i>Location: Los Angeles, CA</i>	<i>In role as stated in letter "b": 6 Years</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: University of California</i>	<i>Educational Institution: University of California</i>
<i>Degree: Master of Arts</i>	<i>Degree: Bachelor of Science</i>
<i>Year: 1972</i>	<i>Year: 1970</i>
<i>Specialization: Transport Planning</i>	<i>Specialization: Civil Engineering</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i>	
<i>Discipline:</i>	
<i>Location of Registration:</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Mike is managing partner of HDR | InfraConsult LLC, a program management and strategic advisory firm with primary focus in the transport sector. He has compiled a significant record of accomplishment in the infrastructure services industry during his 37 years of professional practice and program management, with industry-leading experience in the creation of P3 and project development organizations. Spanning the technical and financial elements of project development, construction, and operation, Mike brings a depth of direct project experience uncommon in the infrastructure advisory field.

Mike's career has incorporated development of highway and toll road projects, urban and intercity transit and rail, innovative financing programs and P3 for infrastructure development in the United States and in many parts of the world. Professionally, Mr. Schneider is a civil engineer, urban planner, and transport economist whose primary area of expertise is planning, development, and operation of transportation systems and facilities.

An expert in policy formation and strategic planning, Mike has provided such services for a large number of governmental and private sector organizations aiming to implement infrastructure projects of all modes and magnitudes. Mike's recent professional focus has been on the utilization of private sector participation in the delivery of transportation projects. His P3 projects have included:

- Los Angeles County Metro (LAMTA) P3 Program, CA
- Honolulu High Capacity P3 Program, HI
- South Road Expressway, San Diego, CA
- Orange County Toll Roads, CA

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project	
NAME	TITLE
Heather Catron	Vice President, NW Transportation Director
PROJECT ROLE	YEARS EXPERIENCE
Technical Advisor	<i>With this firm:</i> 1 Year
<i>Firm name:</i> HDR Engineering	<i>With other firms:</i> 20 Years
<i>Location:</i> Portland, OR	<i>In role as stated in letter "b":</i> 5 Years
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution:</i> United States Navy	<i>Educational Institution:</i>
<i>Degree:</i> Bachelor of Science	<i>Degree:</i>
<i>Year:</i> 1991	<i>Year:</i>
<i>Specialization:</i> Program Management/Delivery	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i>	
<i>Discipline:</i>	
<i>Location of Registration:</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Heather offers more than 21 years of experience developing and directing successful programs to increase efficiencies, performance, and productivity. *She has experience in developing and implementing strategic initiatives and program delivery objectives.* Heather is a performance-driven leader with a verifiable record of driving teams to surpass expectations. Her relevant project experience includes:

- **Innovative Solicitation and Contract Negotiation, ODOT, OR:** Led process for program management, design, and construction services for a \$1.3 billion capital investment program for Oregon DOT, which decreased plan duration from 10 years to 7.5 years and retained over \$30 million in savings.
- **Data Collection Implementation, U.S. Navy:** Responsibilities included day-to-day program coordination, developing new Standard Operating Procedures (SOP), performing program briefings, resolving problematic system anomalies and providing comprehensive user training.
- **Alternative Delivery Program, ODOT, OR:** Managed and integrated an alternative delivery program, including accelerated delivery techniques, holistic outsourcing, performance reporting, and new processes and procedures, resulting in \$500 million of expedited outsourced delivery of roadway, safety, and bridge projects for Oregon DOT.
- **CSS Solutions, ODOT, OR:** Developed and implemented a national award-winning delivery model for Oregon DOT, resulting in over \$50M of potential savings.
- **DB Program, Oregon DOT, OR:** Managed a \$700M program, encompassing program development, definition, resource plans, and industry engagement, receiving national recognition.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Amy Kennedy	Senior Project Manager
PROJECT ROLE	YEARS EXPERIENCE
CSS/Public Involvement	<i>With this firm: 5 Years</i>
<i>Firm name: HDR, Inc.</i>	<i>With other firms: 10 Years</i>
<i>Location: Denver, CO</i>	<i>In role as stated in letter "b": 4 Years</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: University of North Texas</i>	<i>Educational Institution:</i>
<i>Degree: Master of Science</i>	<i>Degree:</i>
<i>Year: 1996</i>	<i>Year:</i>
<i>Specialization: Environmental Sciences/Studies</i>	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i>	
<i>Discipline:</i>	
<i>Location of Registration:</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Amy served as part of the team that developed the CSS Guidance for the I-70 Mountain Corridor. She worked on the PEIS team for more than 10 years and is very familiar with the environmental issues and alternatives analysis associated with the corridor.

Amy maintains excellent working relationships with CDOT and FHWA personnel and has experience with stakeholder involvement in the corridor. Her additional relevant experience includes:

- **I-70 Mountain Corridor PEIS, CDOT, CO:** Amy led parts of technical analyses as well the Financial Committee of the PEIS. She led the Project Leadership Team and Issue Task Forces comprised of agency and public stakeholders and managed information distribution through newsletters and web-based content. In addition, she was heavily involved in the stakeholder outreach and established strong working relationships with Corridor stakeholders.
- **I-70 Mountain Corridor CSS, CDOT, CO:** Amy was a part of the team that developed the CSS Guidance for the Corridor. In addition to working directly with stakeholders to develop the mission statement, core values, and overall guidance she led the Sustainability Working Group. Through these activities Amy has hands-on experience creating consensus in the Corridor.
- **Powers Boulevard EA, CDOT, Colorado Springs, CO:** Amy was the project manager responsible for overall project management, including alternative development and analysis, environmental input analysis, and public involvement. She oversaw all public and agency involvement activities along with coordination of the environmental assessment team members. The project has been shaped and driven by CSS, resulting in a highly refined preferred alternative that met the jurisdictional requirements while addressing public concerns.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Garey Foyt, PE	Procurement Director
PROJECT ROLE	YEARS EXPERIENCE
Project Procurement	<i>With this firm:</i> 16 Years
<i>Firm name:</i> HDR, Inc.	<i>With other firms:</i> 20 Years
<i>Location:</i> Dallas, TX	<i>In role as stated in letter "b":</i> 13 Years
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution:</i> Wayne State University	<i>Educational Institution:</i> Texas A&M University
<i>Degree:</i> Master of Science	<i>Degree:</i> Bachelor of Science
<i>Year:</i> 1993	<i>Year:</i> 1976
<i>Specialization:</i> Civil Engineering	<i>Specialization:</i> Civil Engineering
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i> 1982	
<i>Discipline:</i> Professional Civil Engineer	
<i>Location of Registration:</i> Texas	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Garey knows and understands the technical aspects of alternative delivery processes. *As the S.H. 130 procurement manager, he helped blaze the trail for the Texas DOT's first EDA (now CDA) procurement.* With 36 years in the transportation engineering industry and over 13 years in DB, Garey's hands-on leadership style has been the basis for his success on complex, fast-paced projects. Additionally, Garey knows that DOT leaders are charged with leading innovation and change in a unique, political environment. As a leader, he understands that implementing non-traditional transportation delivery processes and procedures requires flexibility, client understanding, specific solutions, continuous communication and the ability to manage the work of others very well.

Garey's procurement leadership has been instrumental on numerous mega projects around the country, including Legacy Parkway Project in Salt Lake City, UT; TTC/I-35 Project in Austin, TX; I-405 DB for WSDOT; and 12300 South DB for UDOT, as well as:

- **S.H. 130–TTA, TX:** Garey was responsible for the development of a new and innovative approach to transportation funding in the State of Texas. P3 as an alternative delivery approach, the first of its kind in Texas, was developed and implemented for the final construction.
- **Gravina Island Bridge Project, Alaska DOT & Public Facilities, AK:** Garey served as senior program manager and technical advisor principal to the Alaska DOT and Public Facilities to develop the DB process for the design and construction of the Gravina Bridge.
- **T.H. 52 Highway Reconstruction, MnDOT, Rochester, MN:** As project manager, Garey was responsible for developing DB procurement documents associated with reconstructing and widening a nine-mile segment of urban freeway for MnDOT.
- **CTRMA U.S. 183A, TxDOT, Austin, TX:** Garey served as senior technical procurement advisor for the development of procurement and management processes used for the implementation of the first Regional Mobility Authority (RMA) in Texas.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Kern Jacobson	Principal Consultant
PROJECT ROLE	YEARS EXPERIENCE
Commerical Program	<i>With this firm: 20 Years</i>
<i>Firm name: HDR InfraConsult</i>	<i>With other firms: 18 Years</i>
<i>Location: Los Angeles, CA</i>	<i>In role as stated in letter "b": 20 Years</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: University of Colorado</i>	<i>Educational Institution: University of Washington</i>
<i>Degree: Master of Science</i>	<i>Degree: Bachelor of Science</i>
<i>Year: 1971</i>	<i>Year: 1969</i>
<i>Specialization: Civil Engineering</i>	<i>Specialization: Civil Engineering</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered: 1973</i>	
<i>Discipline: Professional Civil Engineer</i>	
<i>Location of Registration: Colorado</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Kern has extensive experience in public infrastructure projects, particularly in the transportation market, and is a registered professional engineer in 13 states. His experience includes both rail and highways and runs the gamut of project delivery, including planning, finance, engineering, and management. Mr. Jacobson has conducted value engineering and quality control reviews of major projects throughout the United States. His experience includes P3, DB, CM @ risk, and PM at risk project delivery.

Kern has been an independent consultant to the infrastructure industry, both to the public sector and the private sector, since 2008. He has served as a senior consultant to The Macquarie Group, one of the largest private investors in infrastructure globally, served as a management and P3 consultant to two major engineering consulting firms, and is *part of the consulting team, led by HDR | InfraConsult, assessing the viability and recommending approaches for six P3 projects in the L.A. area*, including three transit and three highway projects, on behalf of LAMTA.

His P3/DB experience includes:

- **Trans-Texas Corridor TTC-35, TX:** Principal in charge of consultant team for P3 concessionaire (Cintra-Zachry) leading planning and design of a new transportation corridor running parallel to IH 35, consisting of a network of toll roads; HOT/HOV lanes; commuter, freight, and high-speed rail lines; and a utility corridor. He managed feasibility studies, roadway, traffic, structures, drainage design, and traffic modeling.
- **S.H. 130 Segments 5 and 6 Final Design, Austin, TX:** Principal-in-charge of consultant team for this P3 project led by Ferovial (contractor) leading final design of Segments 5 and 6 of a new freeway bypass of Austin. Included all roadway, traffic, structures, and drainage design for this \$1B DB project.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project	
NAME	TITLE
Khalid Bekka, PhD	Economics & Finance Director
PROJECT ROLE	YEARS EXPERIENCE
Finance	<i>With this firm:</i> 14 Years
<i>Firm name:</i> HDR, Inc.	<i>With other firms:</i> 8 Years
<i>Location:</i> Silver Spring, MD	<i>In role as stated in letter "b":</i> 22 Years
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution:</i> University of Delaware	<i>Educational Institution:</i> University of Delaware
<i>Degree:</i> Doctor of Philosophy	<i>Degree:</i> Master of Science
<i>Year:</i> 1997	<i>Year:</i> 1995
<i>Specialization:</i> Economics	<i>Specialization:</i> Economics
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i>	
<i>Discipline:</i>	
<i>Location of Registration:</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Khalid is a management consultant and an applied economist with diverse skills in research, program/project management, traffic and revenue forecasting and financial risk analysis. *Over the past 22 years, Dr. Bekka has managed numerous toll roads, scenario development and pricing studies* on behalf of the TIFIA office, state agencies, and bond insurers.

Khalid has also created several economic and financial assessment frameworks for major transportation investment projects and has a strong track record in providing annual credible and transparent forecast to several agencies around the country. His additional relevant experience includes:

- **Colorado Front Range Rail Study, CDOT:** Helped estimate the economic benefits associated with relocating a major rail route along the Colorado Front Range (away from downtown Denver).
- **California High Speed Rail Study, City of Palmdale, CA:** As project manager conducted a critical review of the preliminary alignment decision made by consultants for the California High Speed Rail Commission.
- **CEVP for Major Corridors, UDOT:** Project manager that conducted CEVP for major highway investments within urban regions. The potential P3 corridors include S.R. 77, East West Highway, and S.R. 92.
- **Risk Analysis of Traffic and Revenue Forecast for VA Greenway Toll Road, MBIA Insurance Corporation:** Principal-in-charge conducted traffic and revenue forecast and financial analysis for the Greenway toll road in Virginia.
- **S.R. 108 Cost Risk Analysis, UDOT:** Project manager for the development of a risk analysis simulation model for assessing the cost and schedule of five improvement alternatives (alignments) for S.R. 108.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Ed Icenogle	Legal Counsel
PROJECT ROLE	YEARS EXPERIENCE
Legal	<i>With this firm: 26 Years</i>
<i>Firm name: Icenogle Seaver Pogue</i>	<i>With other firms: 8 Years</i>
<i>Location: Denver, CO</i>	<i>In role as stated in letter "b": 29 Years</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: University of Nebraska</i>	<i>Educational Institution:</i>
<i>Degree: Juris Doctorate</i>	<i>Degree:</i>
<i>Year: 1977</i>	<i>Year:</i>
<i>Specialization: Law</i>	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered: 1978</i>	
<i>Discipline: Lawyer</i>	
<i>Location of Registration: Colorado, Nebraska</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Ed has served on public works contracting, *including traditional and alternative delivery systems for transportation (both roads and transit) including DB contracting, P3, and monetization of public assets*. He has experience representing a substantial number of regional transportation authorities, comprising numerous municipalities and counties. His project experience include:

- **Northwest Parkway Greenfield Concession, Northwest Parkway Public Highway Authority, Broomfield, CO:** Senior Colorado legal counsel for the public owner of the Northwest Parkway in its 15-month procurement of a private monetization concession of the toll road. Completed in late 2007, the project remains the only completed highway concession in Colorado and the Rocky Mountain west. The value of the concession was in excess of \$500 million.
- **Colorado Springs/El Paso County Transportation Finance, Pikes Peak Rural Transportation Authority, Colorado Springs, CO:** Legal counsel from inception in 2005 of this transportation finance entity, comprising one county and four municipalities, funding to date in excess of \$500 million of highway, street and transit capital and maintenance projects with sales/use tax revenues.
- **Initial Colorado I-70 Mountain Corridor Fixed Guideway, Colorado Intermountain Fixed Guideway Authority, Idaho Springs, CO:** Legal counsel for authority, created by the Colorado General Assembly, to conduct preliminary exploration of the use of fixed guideway technology for high speed transit between the Denver metropolitan area and Colorado's mountain ski and recreation areas, funded by federal and state grants.
- **Northwest Parkway, Northwest Parkway Public Highway Authority, Broomfield, CO:** Legal counsel from inception for all elements of the development of the Northwest Parkway toll road in the northwest quadrant of the Denver metropolitan area, including legal work for procurement and negotiation of DB contractor.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project	
NAME	TITLE
Ken Smith, PE	Principal Project Manager
PROJECT ROLE	YEARS EXPERIENCE
Risk Management	<i>With this firm: 15 Years</i>
<i>Firm name: HDR, Inc.</i>	<i>With other firms: 18 Years</i>
<i>Location: Phoenix, AZ</i>	<i>In role as stated in letter "b": 15 Years</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: Northern Arizona Univ.</i>	<i>Educational Institution:</i>
<i>Degree: Bachelor of Science</i>	<i>Degree:</i>
<i>Year: 1988</i>	<i>Year:</i>
<i>Specialization: Civil Engineering</i>	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered: 1992</i>	
<i>Discipline: Professional Civil Engineer</i>	
<i>Location of Registration: California, Arizona, Texas</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Ken is a registered professional engineer and senior mega-project manager with more than 33 years of experience, including numerous major light and heavy rail, freeway, tollway, highway, utility, flood control, bridge and other civil infrastructure projects. He has extensive experience in all aspects of project delivery, including design, permitting, environmental, right of way acquisition, utilities, construction management, and project controls.

Ken is also an expert in alternative delivery methods, including DB and P3. *He has a litany of successful projects to his credit in both procurement and delivery of major projects, utilizing a host of delivery models.* Mr. Smith is a senior vice president for the firm. His relevant project experience includes:

- **Legacy West Davis Highway, UDOT, Salt Lake and Davis Counties, UT:** Served as the quality program author for the design-build RFP, performed scheduling and constructibility review for this 11-mile, \$350 million freeway.
- **S.H. 130, TxDOT, Central TX:** Managed the construction and contract management operations and was the deputy program manager on the DB S.H. 130 toll road project in Austin, Texas. The first phase of this \$1.3 billion project consisted of 49 miles of concrete paved mainlines and asphalt-paved frontage roads, along with 125 bridges spanning numerous rivers, creeks, state highways, county roads, and local streets.
- **S.H. 45 SE, TxDOT, Austin, TX:** Project principal for this \$160 million toll road construction project that was to be delivered utilizing a design-build process.
- **Trans-Texas Corridor 35, TxDOT, Central TX:** Mr. Smith advised TxDOT in the development of the P3 concession agreement for this \$6 billion program for a corridor development package.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project	
NAME	TITLE
Steve Long, PE	Colorado Transportation Program Manager
PROJECT ROLE	YEARS EXPERIENCE
Project Development	<i>With this firm:</i> 2 Years
<i>Firm name:</i> HDR, Inc.	<i>With other firms:</i> 27 Years
<i>Location:</i> Denver, CO	<i>In role as stated in letter "b":</i> 20 Years
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution:</i> University of Colorado	<i>Educational Institution:</i>
<i>Degree:</i> Bachelor of Science	<i>Degree:</i>
<i>Year:</i> 1984	<i>Year:</i>
<i>Specialization:</i> Civil Engineering	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i> 1989	
<i>Discipline:</i> Professional Civil Engineer	
<i>Location of Registration:</i> Colorado	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Steve has a diverse background including highway, rail, aviation, light rail and drainage projects. His experience encompasses all phases of a project from environmental planning and NEPA documentation through preparing final construction documents and providing construction management. *By specializing in complex, multi-million-dollar, multi-disciplinary projects, Steve brings expertise in constructability and risk assessment to projects of all types and sizes.* His relevant project experience includes:

- **Eagle P3 Commuter Rail, RTD, Denver, CO:** Principal-in-charge for the 25 mile DBFOM, which will extend commuter rail from the Denver city center on three new lines to multiple suburban locations and the Denver International Airport.
- **Wolf Creek Pass-East Reconstruction, CDOT, South Fork, CO:** Project manager for environmental assessment and design for reconstruction of eight miles of US 160 in steep mountainous terrain. The roadway is in steep canyons and required extensive blasting, laterally cantilevered structures including a bridge, and extensive use of retaining walls. The project also included a 1,000-foot-long tunnel through a tightly constrained portion of the alignment with steep canyon walls. Project construction costs totaled between \$60 and \$70 million.
- **West Corridor Light Rail Transit Final Engineering Design Services, RTD, Denver, CO:** Project manager and chief engineer for the \$850M, 12-mile-long CM/GC West Corridor, which was the first corridor to go to final design for the FasTracks multi-corridor program.
- **Arapahoe Road and Parker Road Interchange Final Design, CDOT, Aurora, CO:** Project manager for the interchange design, the culmination of over a decade of work which included a full feasibility study, environmental assessment and design.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
Gina McAfee, AICP	Environmental Planning Program Manager
PROJECT ROLE	YEARS EXPERIENCE
NEPA Development	<i>With this firm:</i> 1 Year
<i>Firm name:</i> HDR, Inc.	<i>With other firms:</i> 34 Years
<i>Location:</i> Denver, CO	<i>In role as stated in letter "b":</i> 30 Years
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution:</i> Colorado State University	<i>Educational Institution:</i>
<i>Degree:</i> Bachelor of Science	<i>Degree:</i>
<i>Year:</i> 1977	<i>Year:</i>
<i>Specialization:</i> Landscape Architecture	<i>Specialization:</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered:</i>	American Institute of Certified Planners
<i>Discipline:</i>	
<i>Location of Registration:</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

Gina has invaluable experience on the ***Eagle P3 Commuter Rail project as program manager and on five I-70 Mountain Corridor projects***. She also worked on the U.S. 36 Corridor Phase 1 and Phase 2 project, which was a P3. Her notable I-70 Mountain Corridor project experience includes:

- **I-70 Mountain Corridor Collaborative Effort, CO:** Senior NEPA advisor providing NEPA expertise for the six-month long Collaborative Effort, which culminated in a choice for a Preferred Alternative to move forward after the previous effort stalled due to public controversy. Gina served in an instrumental way to answer NEPA-related questions for the Collaborative Effort.
- **I-70 Mountain Corridor PEIS Rewrite, CO:** Gina was handpicked by FHWA to be the only consultant team lead for this blended team effort to rewrite the PEIS. This effort has won a national award from the National Association of Environmental Professionals for innovation and environmental stewardship.
- **I-70 Mountain Corridor Twin Tunnels EA, CO:** Deputy project manager for this first Tier 2 NEPA process.
- **I-70 Mountain Corridor AGS Feasibility Study, CO:** Provided NEPA advice and guidance for this study.
- **I-70 Coalition Land Use and Transit Station Study, CO:** Provided QA/QC review of the deliverables for this project.
- **Eagle P3 Commuter Rail Project, Denver, CO:** Program manager for 25 mile long commuter rail project from the Denver city center on three new lines to multiple suburban locations and the Denver International Airport.

CDOT Form A

Key Personnel Resume

Brief Resume of Key Personnel/Officer's team members anticipated for this project

NAME	TITLE
David Jurich	Vice President
PROJECT ROLE	YEARS EXPERIENCE
Tunnels	<i>With this firm: 9 Years</i>
<i>Firm name: Hatch Mott MacDonald</i>	<i>With other firms: 23 Years</i>
<i>Location: Lakewood, CO</i>	<i>In role as stated in letter "b": 15 Years</i>
EDUCATION	EDUCATION (CONTINUED)
<i>Educational Institution: Colorado School of Mines</i>	<i>Educational Institution: Colorado School of Mines</i>
<i>Degree: Master of Science</i>	<i>Degree: Bachelor of Science</i>
<i>Year: 1986</i>	<i>Year: 1976</i>
<i>Specialization: Geological Engineering</i>	<i>Specialization: Geological Engineering</i>
ACTIVE REGISTRATION	CERTIFICATIONS
<i>Year First Registered: 1988</i>	
<i>Discipline: Professional Civil Engineer</i>	
<i>Location of Registration: Colorado</i>	

EXPERIENCE AND QUALIFICATIONS RELEVANT TO THE PROPOSED PROJECT

David has 32 years of engineering and management experience in the investigation, design, construction, and rehabilitation of tunnels and underground structures for transportation and transit, water resource, hydroelectric power plants, and scientific facilities in North America and overseas. He has completed conceptual studies, geotechnical site investigations, detailed engineering designs, and construction engineering for numerous hard rock underground projects.

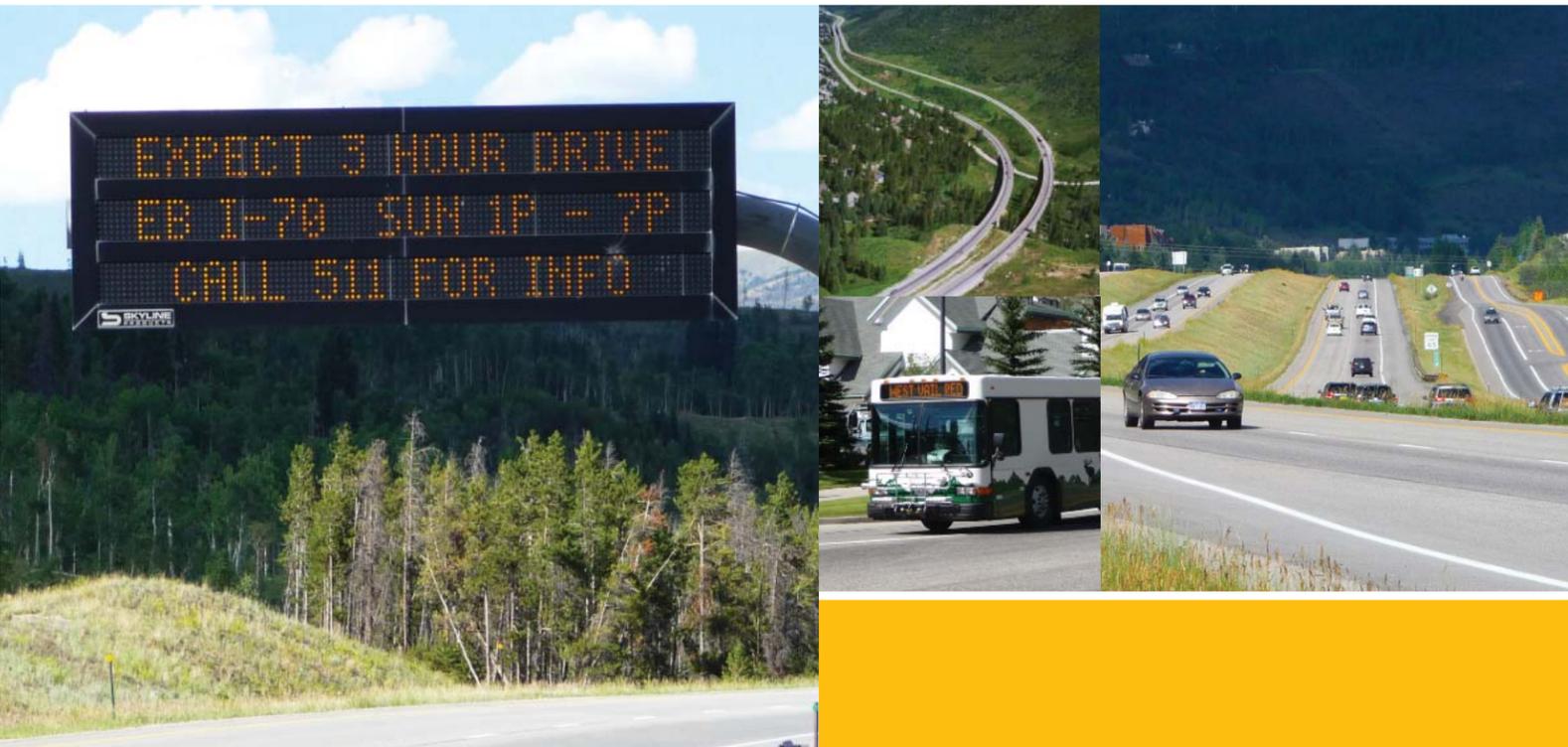
David is experienced in tunnels constructed using drill, blast, and tunnel boring machines in open and pressurized modes. He also is experienced in shafts constructed using drill, blast, and shaft boring machine methods. *Mr. Jurich has been responsible for the design and construction of heavy civil underground projects in a wide range of conditions that include remote environmentally sensitive public lands, rehabilitation and modifications in operating tunnels, highly altered rock, high groundwater pressures and inflows, high in situ stresses, and overstressed rock.*

- **California High-Speed Train (CHSTP), Palmdale to Bakersfield Segment, California High Speed Rail Authority, CA:** Tunnel Design Lead for Palmdale to Bakersfield section of the 800-mile dedicated high-speed rail P3 program. Responsible for interpretation of geotechnical investigation results and preliminary engineering for the construction of several twin tunnels through the Tehachapi Mountains.
- **Eisenhower Johnson Memorial Tunnel (EJMT) Structural Inspection, CDOT, Denver, CO:** Responsible for structural inspection of the 1.7-mile long twin EJMT, including structural CIP liner, precast divider wall, and suspended ceiling of air plenums following FHWA guidelines modified for project conditions.

6.2

PROJECT TECHNICAL PLAN - HIGHWAY AND TRANSIT

6.2 PROJECT TECHNICAL PLAN
HIGHWAY AND TRANSIT



6.2_Project Technical Plan

6.2.1_Project Plan Components

Our Project Plan is based on our study and assessment of the Corridor issues and challenges coupled with the key assumption of our approach. The Project Plan was formulated to address three key considerations related to the I-70 Mountain Corridor:

- **PEIS and ROD:** The time and effort invested in this Corridor have provided a clear program of improvements to be implemented by CDOT and the Co-Developer. The Project Plan must be consistent with the ROD and, if refinements are recommended, the rationale must be consistent with the Adaptive Management philosophy that was crafted to address changing conditions of the Corridor.
- **Available funding:** There is none. Or maybe better put, there is little that is available from public sources. New and innovative approaches are needed, but in all cases the approaches will depend upon user fees to pay for the majority of the improvements. A critical part of the work of the CDOT/Co-Developer team will be to define acceptable approaches and then articulate the reasons why the public and the private-sector marketplace should support these proposals.

- **Public interest:** After more than 12 years of listening, thinking and working on the problems and the solutions in the Corridor, the process to make the actual improvements must allow for continued engagement. Stakeholders in the Corridor, users, and all residents of Colorado will need opportunities to understand the ideas and proposals. The CSS process must continue to serve as the foundation of the engagement and communi-

cation program for CDOT and the Co-Developer team.

Our Project Plan was created to address these requirements while at the same time minimizing the risks that could limit success. Our overall objective is to provide a reasonable and practical program of improvements attractive to the private equity marketplace in order to procure the concessionaire.

We have established a set of guiding principles to serve as the framework for our Project Plan; they are set forth in the following text box.

Guiding Principles

1 Our Project Plan is consistent with the PEIS and ROD. It is a phased plan to make improvements at a pace that is supported by stakeholders and reasonable in terms of risk. It is carefully designed to be consistent with the AGS feasibility determination.

2 As many of the projects in the Minimum Program will be implemented as are within the practical limitations of the Plan. In identifying projects for implementation, **priority was given to mobility within and through the Corridor.**

3 In return for mobility improvements, the people who chose to use the Corridor will be required to pay fees in the form of tolls. Improvements will be made to minimize congestion and travel time. **The improvements will be linked in a “managed user-fee Corridor” to ensure reliable travel times.**

4 Current and expected funding for the I-70 Mountain Corridor must continue. **The Corridor must be “held harmless”** and current funding must continue to be applied.

5 New sources of funding from local, state, and federal sources must continue to be a part of the solution. **Eligibility for discretionary funding and sources of leverage such as TIFIA or SIB must be maintained.**

6 Transit services must play a primary role in serving travel demands from the earliest parts of the Project Plan. **Over time, transit must become a significant travel option;** incremental service integrated with major investments like AGS will achieve this goal.

7 The Project Plan provides for an orderly series of improvements implemented in the most practical manner as soon as reasonable. **Impacts will be minimized.**

8 The Adaptive Management and CSS approaches must serve as the ongoing foundation for engaging stakeholders.

Refinements to these approaches will be made in the Project Development and Procurement phases to reflect the requirements within which CDOT and FHWA must operate.

9 For the Project Plan to be successful, it must be flexible and adaptable

to the realities of the marketplace, of the regulatory agencies, and of the stakeholders. Our team will present these options to CDOT, and we will jointly make decisions about how to create the best program for the Corridor.



David Jurich has designed and constructed heavy underground projects in a wide range of conditions, including environmentally sensitive land, rehabilitation and modification of operating tunnels, and overstressed rock.

Establish User Fee Corridor

The central part of our strategy is to establish a “User Fee Corridor” along I-70 from Eagle to C-470 to provide for “Corridor-level” mobility. The concept is to improve mobility for all users for travel from point-to-point along the Corridor. Users would pay a fee (toll) to pass through the gateways, which would provide the foundation for revenues to make improvements. If users can complete their trip without passing through a gateway then they would not pay a fee for that trip. Gateways are described in the following section.

CDOT will utilize federal regulation 23 USC 129 Toll roads, bridges, tunnels and ferries and apply the options allowed in Section 129 to the I-70 User Fee Corridor. These options include:

- Levy tolls as tunnels/bridges are reconstructed or expanded.
- Levy tolls on new tunnels/bridges as they are constructed.

As required in Section 129, CDOT and FHWA will need to develop an overall agreement to enact these user fees and then individual agreements for each project-specific improvement. This requirement

relates well to the CSS process that is in place for the Corridor; each step allows input from stakeholders. Because of the scale, uniqueness, and comprehensive nature of the I-70 Mountain Corridor—and the fact that there are no other options to provide revenues needed for the program—CDOT and FHWA may need to develop a model program for application in other parts of the country.

Highway and Tunnel Elements

The Project Plan for the highway and tunnel elements was created to address three key requirements:

- Improvements will be consistent with the ROD and the Base Case. A primary objective is to resolve congestion points during peak periods. The ROD addresses the congestion points first. Only with demonstrated need following actual experience, will more substantial improvements (e.g., widening to six-lanes) be implemented using Adaptive Management.

- Improvements will work together and will be managed to address peak period congestion and improve reliability. The Corridor will be managed in peak periods to provide priority for higher occupant (more efficient) vehicles, and for those willing to pay for the priority through the congestion points.
- All users will pay for the mobility improvements when they pass through gateways along the Corridor, or when they access the Corridor from primary system highways. Rates at certain gateways will vary by time of day/day of week/season of year to maximize congestion relief.

Gateways

The Project Plan is composed of a series of “gateways” across the 140 miles of the Corridor. The gateways represent transaction points through which users trigger a charge. A total of eight gateways are proposed, as presented in Table 4.

The gateways are placed at major structure locations along the Corridor. Federal statute 23 USC Section 129 permits state DOTs to toll existing structures to make improvements.

Local Interchanges

Over 20 local service interchanges were identified for improvement as part of the Minimum Program. These improvements are not needed to provide the required capacity for improved mobility through the Corridor on the I-70 mainline during the congested peak periods. Because the function of these improvements would be for access rather than mobility, improvements will not be made as part of the user-fee program unless the improvement was needed as part of the tunnel or managed lane reconstruction. Any improvements to the mainline will be designed and built to not preclude future improvements to the local interchanges. If local jurisdictions are interested in making the improvements at the same time, we will work cooperatively to implement the project.

Table 4_Gateway Locations and Types

No.	Gateway	Location	Type	User Changes
1	S.H. 131/Wolcott Junction	MP 158	State Highway Interchange	All vehicles from S.H. 131 to EB I-70; constant rate
2	U.S. 24/Dowd Canyon	MP 168	US Highway Interchange	All vehicles from U.S. 24 to EB or WB I-70; variable rate by H/D/W
3	S.H. 91/Copper Mtn.	MP 197	State Highway Interchange	All vehicles from S.H. 91 to EB or WB I-70; constant rate
4	S.H. 9/Frisco	MP 202, Frisco	State Highway Interchange	All vehicles from S.H. 9 to EB or WB I-70; constant rate
5	S.H. 9/Silverthorne	MP 204, Silverthorne	State Highway Interchange	All vehicles from S.H. 9 to WB I-70; constant rate
6	EJMT	MP 210, Continental Divide	New Third-Bore Tunnel	All vehicles; variable rate by H/D/W
7	U.S. 40/Empire	MP 233, b/t Idaho Springs and Georgetown	US Highway System Interchange	All vehicles from U.S. 40 to EB or WB I-70; variable rate by H/D/W
8	Twin Tunnels	MP 243, east of Idaho Springs	WB Tunnel; new bridges & lanes to Floyd Hill	All vehicles; variable rate by Hour/Day/Week (H/D/W)

Source: HDR; July 2012

Managed Lanes

As a way to resolve congestion in the bottleneck locations, improvements will be made to add peak-period lane capacity as well as add capacity to the existing structures. Managed lanes address this need and would be composed of two types:

- **Hardened shoulders:** CDOT is currently moving forward to improve the shoulders in critical sections for use during congested peak periods. These shoulders will be a part of the “managed” corridor and be subject to restrictions on usage according to time of day and level of congestion.

- **Auxiliary lanes:** As identified in the Minimum Program, these lanes would be built and equipped to toll vehicles expected to pay a “premium” for the priority if they did not meet certain high occupancy requirements.

The auxiliary lanes would work in conjunction with the gateway improvements and the hardened shoulder lanes to provide continuous lanes of added capacity during congested peak periods. Variable message signs will be used to direct drivers to use appropriate lanes depending upon the actions required to manage vehicle flows for reliable travel times.



Corridor Traffic Management Center

As part of the toll and congestion management system, a traffic control center will be established for the Corridor with capabilities to monitor operations and manage traffic flows through various pricing schedules. Variable message signs as well as cellular technology (internet, social media, etc.) will be used to communicate conditions and provide options to help users make travel decisions. More detail is provided later in this section.

Program Implementation

The focus of the HDR Project Plan is to position CDOT to implement improvements using alternative delivery and private sector financing. Our Plan offers two options: P3 Concessionaire Program and CDOT/HPTe Program. Because the P3 Concession is more desirable, this proposal refers to that option first, but most decisions and actions will be similar in either condition.

Scope of Work for P3 Concession Agreement

The scope of work for the concession agreement is based on our Guiding Principles to make improvements to mobility through the Corridor, and to be consistent with the ROD. The sequence of improvements is tied to the generation of user revenues to pay for improvements. To comply with Section 129 requirements, the implementation of tolls cannot start until the actual improvement activities are started. Activities for improvements can

The HDR team will provide CDOT and HPTe with “out-of-the-box” thinking balanced with practical solutions.

include preconstruction steps such as PE, NEPA, and CSS.

Our approach requires the P3 concessionaire to assume the revenue risk of the program. The advantage of a phased series of improvements is that the concessionaire will observe the revenue levels that can be generated initially and then tie those to the schedule of improvements.

The concessionaire will be required to make commitments “at risk” to advance the Corridor program. Payments from the concessionaire will be used to “seed” or fund activities by CDOT or the HDR Co-Developer to make any capital improvements prior to user fees being generated. These commitments will be incremental and managed jointly by CDOT, HDR, and the concessionaire.

The concession scope of work is composed of four parts:

- Base bid (B)
- Base plus Core projects (B+C)
- Base plus Core plus Option projects (B+C+O)
- Base plus Core plus Options plus AGS (B+C+O+AGS)

Base Bid

Completion of the final design and implementation of improvements at the EJMT for user-fee toll generation and for upgrades to the existing tunnels are included in the Base Bid. This project would qualify for a Section 129 agreement

with FHWA. There is a possibility that this project will be the only project completed by the concessionaire. Specific improvements in the Base Bid will consist of:

- Toll facilities on the east and west approaches to the tunnels.
- Minor lane adjustments to support the toll facilities.
- Traveler information, other ITS/ ATMS equipment, and control systems for toll collection and operations management.
- Rehabilitation of the existing EB and WB bores to improve fire/life safety to allow joint use of tunnels by all trucks and automobiles at the same time.

Base Bid plus Core Projects

Core projects will include improvements to the two congested bottleneck portions of the Corridor: EJMT-Third Bore and Twin Tunnels to Floyd Hill. CDOT is already advancing improvements providing peak-period lanes on hardened shoulders to be matched with improvements at the bottlenecks. Proposers will be asked to provide an approach and funding schedule to complete the Core projects following completion of all or part of the Base projects. Improvements will consist of:

- **EJMT:** Construction of the third bore and the addition of the auxiliary lanes on the east side that will:



- Align with the new three-bore complex.
- Link to hardened shoulders leading further east for lane balance.
- Be equipped with toll facilities to operate as “managed lanes”.
- **Twin Tunnels to Floyd Hill:** Widening of the WB tunnel, additional lanes to Floyd Hill, reconstruction of the U.S. 6 interchange and bridges, additional lanes to achieve lane balance from the east side of Idaho Springs to the top of Floyd Hill, and toll facilities for WB traffic between Floyd Hill and the Clear Creek crossing at U.S. 6.
- **Corridor Management System:** There is already an extensive system of existing fiber optic facilities and traffic management/control facilities along the I-70 Corridor. The concessionaire will be

required to develop and install a Corridor management system as a separate system or by integrating with existing systems.

Base plus Core plus Options

In seeking “best value” from prospective concession teams, proposers will be required to submit costs and a schedule for the implementation of remaining improvements within the Minimum Program. CDOT and the HDR team will develop a list of priorities and will link these to the potential for Section 129 approvals for gateways along the Corridor. Within the concession agreement, terms will be provided to the concessionaire for exclusive rights to develop these other projects over a fixed period, possibly 10 to 15 years. Certain performance requirements will be set such that failure to perform will allow CDOT to procure other teams to implement needed improvements.

Base plus Core plus Options plus AGS

By requiring the concessionaire to assume the revenue risk of Corridor implementation, a conflict could exist between the highway user-fee structure and the AGS funding and fare structure. One possibility is to include an option in the concession agreement for the AGS project to be incorporated into the overall program following determination of feasibility.

Compatibility with the Base Case

The HDR Project Plan is compatible with the Base Case described in the RFP. Table 5 presents a comparison of the Base Case and the HDR Project Plan.

Project Development Details

We have completed 10% concept design work on each of the individual projects in our Plan.

Table 5 Comparison of Base Case and Project Plan

Base Case Component	HDR Plan Element	Explanation
Minimum Program of Improvements	Improvements at critical congestion points to provide improved mobility with greater reliability through the Corridor; a Base project is also included for initiation of user-fee tolls in the Corridor at EJMT.	At completion of the HDR Plan, travel demand management of the Corridor will be possible through user-fee adjustments and priority for multi-occupant vehicles.
Additional Elements of Maximum Program Subject to Thresholds	To be consistent with the PEIS ROD, the HDR Plan does not provide for any elements in the Maximum Program except for the EJMT Third Bore.	No future improvements of the Maximum Program will be precluded by the HDR Plan; Adaptive Management will be applied in determining need.
AGS Phased Implementation	HDR Plan provides for the inclusion of the AGS following determination of feasibility in October 2013.	HDR Plan for concessionaire provides an option to incorporate an AGS program in their program.
New Bores at EJMT and WB Twin Tunnels Widening or 3rd Bore	HDR Plan includes improvements at both locations as part of our Core Program.	Improvements are also made at EJMT in our Base Program to initiate tolling in the Corridor at a critical location for the rehabilitation and upgrade by the existing tunnels.



The conceptual design has permitted us to prepare cost estimates for each project and to define the required implementation schedule for each. This information is contained in the project profiles in the Appendix.

Figure 1 (in the Appendix) presents the location of projects in the Corridor and a summary of each from west to east. Scoping-level costs are presented as well.

Improvements to EJMT

Three critically important projects will be implemented at the EJMT complex in our Project Plan:

- **Base project:** This will be the initial tolling location that will start implementation of the user-fee corridor. The tunnel rehabilitation project will also be a part of the Base project. Upgrades will be made to the fire/life safety systems in order to allow trucks carrying hazardous materials to be in the tunnel with other traffic. This will reduce or eliminate the need for periodic closures of the tunnel to traffic in either direction to permit trucks to use the tunnels. The

rehabilitation project will generate immediate benefits to the traveling public and to the trucking industry through substantial reduction of delays due to closures. A retrofitted water-mist fixed-fire fighting system will be designed and installed at the EJMT. Specific design and performance requirements include:

- Improved self-rescue conditions
- Improved access and operating conditions for fire and rescue
- Prevention of fire spread from one vehicle to another
- Limit structural damage to the tunnels

A schematic of the water mist system is illustrated in Figure 2.

- **Core project-EJMT Third Bore:** This project will be one of two projects in the Core program that will resolve the congested bottlenecks at each end of Clear Creek County (project #6). Technical studies have shown that the third bore would probably be placed to

the north of the Eisenhower tunnel. The existing tunnel would be used as a reversible system to reduce congestion in the peak direction on peak days.

- **EJMT Option project:** This project would provide the auxiliary lanes on the east side of the tunnel complex, leading to the three-portal system. The auxiliary lanes would be built to the inside and used on peak days as managed lanes. Lane balance is critical through the tunnel complex; volumes that pass through the tunnel must not overload the number of lanes leading to or away from the tunnel. The auxiliary lanes would lead to the reversible Eisenhower tunnel and additional priority would be provided to users of these lanes through the tunnel. Lane balance would be adjusted on the west side as well. At the east end of the auxiliary lanes, connections to the peak period shoulder lanes will provide continuity and efficient operations in the managed system.

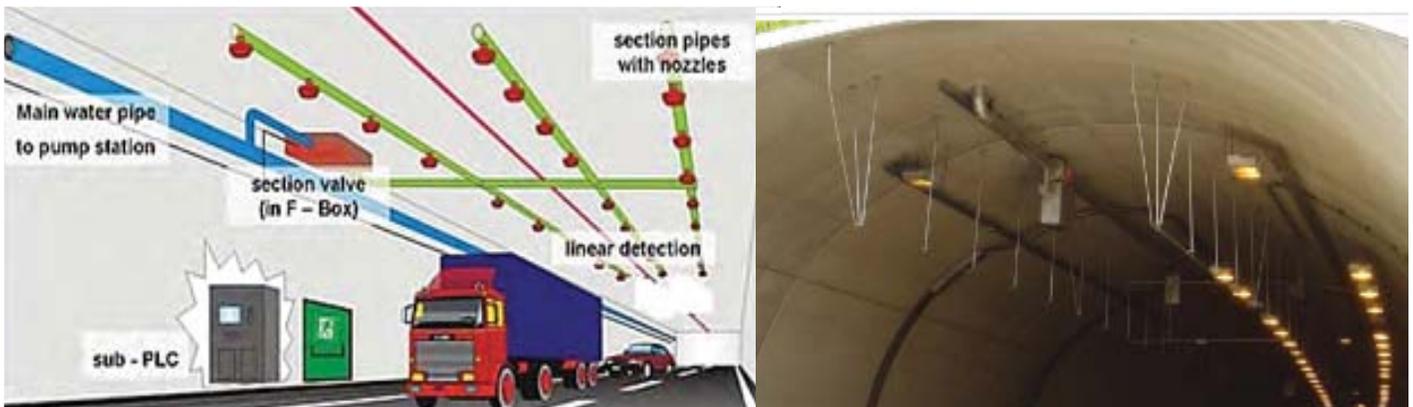


Figure 2_Water Mist Fire Suppression Systems for Tunnels

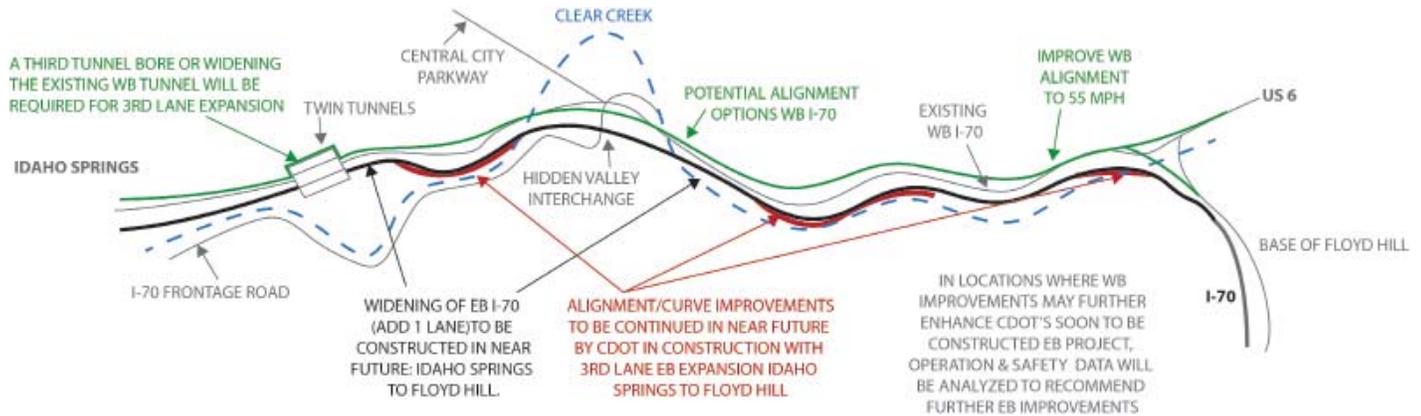


Figure 3_Plan related to Current Twin Tunnels Project

Compatibility with Proposed Twin Tunnels Improvements

The current CDOT project widens the EB tunnel and adds a third lane from the East Idaho Springs interchange (MP 240) to the bottom of Floyd Hill. Toll facilities will be erected on the west approach to record users who chose to travel in the new lane, which will be tolled and therefore managed. This CDOT-led project will result in dramatically improved traffic operations because of the capacity addition and the better lane balance through this segment to Floyd Hill.

The HDR Project Plan identifies this location as the second of the two core projects that will be requested of the P3 concessionaire. Figure 3 presents the conceptual layout of the HDR Project Plan with the Twin Tunnels projects. While remaining consistent with the PEIS ROD, improvements through this segment for the user-fee Corridor will consist of:

- Widening of the WB tunnel to provide a third lane similar to the EB tunnel.

- Reconstruction of the U.S. 6/I-70 interchange and associated structures over Clear Creek at this location.
- Addition of a third lane to match EB lane configuration between the top of Floyd Hill and East Idaho Springs interchange. Coordinate with the CDOT project to implement Peak Period Shoulder Lanes that will offer additional management flexibility along Clear Creek valley.
- Tolling of all lanes at the eastern-most gateway in the I-70 user-fee Corridor. In this location, the toll transactions would be counted on the west side of the Twin Tunnels for EB traffic and at the top of Floyd Hill for WB traffic.
- Part of the consideration for widening of the WB tunnel includes location of the AGS system. Preliminary alignments for AGS have been shown to the south and at a higher elevation than I-70. We will coordinate with the AGS project and not preclude future implementation.

Proposed Phasing and Scheduling

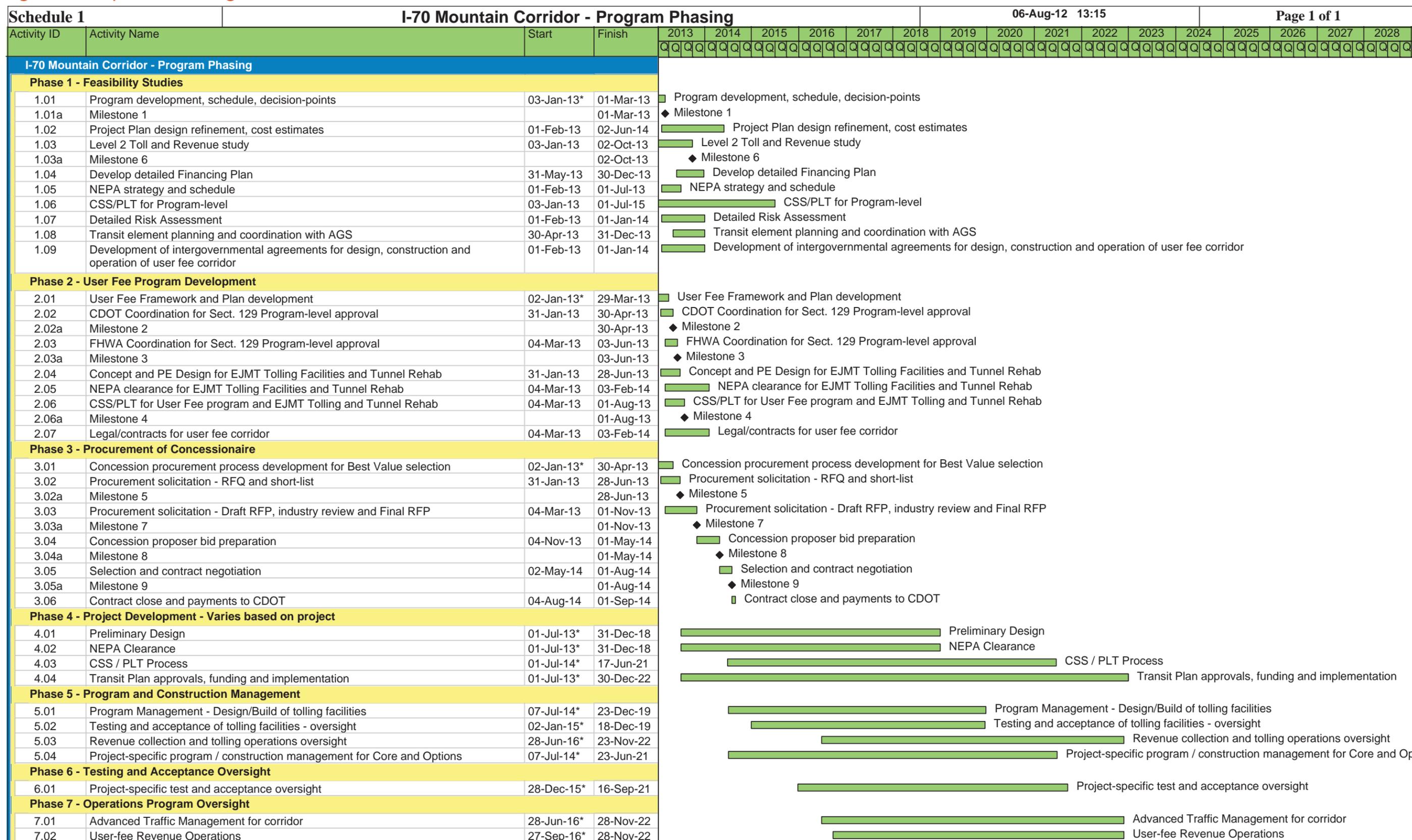
Our Program Phasing Schedule is composed of four phases outlined in the current scope of work, and another three phases for construction, testing, and operations. Figure 4 shows the seven phases and the durations of each.

Our Program Phasing will achieve contract execution with the concessionaire in 20 months. The first three phases present an integrated process that will help CDOT and FHWA make the required decisions to advance the program. Ten primary milestones are depicted in the overall 20-month schedule.

Construction Delivery Methods

We have designed our program to be flexible to construction delivery methods to limit disruption and costs while maximizing safety and quality. Because the primary objective of our program is to engage a concessionaire, the program would need to offer that flexibility to the successful proposer. If Phases 1 and 2 determine that the concessionaire option is not feasible, then a publicly financed

Figure 4_Proposed Phasing Schedule





program will be advanced. In this scenario, specific projects would be evaluated for a series of considerations related to construction methods prior to procurement activities. These considerations would include:

- Complexity
- Costs and financing plans
- Third party conflicts
- Right-of-way required
- CSS/PLT process risk
- MOT and construction phasing

With the results of the evaluation, we would identify appropriate methods for construction of each project including DB, DBB, DBF, DBO, DBFO, and CMGC.

Proposed Early Action Projects

We have defined several Early Action projects as a part of our overall Project Plan. These consist of the following:

- Base project to update and rehabilitate the EJMT complex.
- Base project to include toll facilities at EJMT with minor lane balancing adjustments on both approaches.
- Definition and integration of the ATM/ITS system, control, and network requirements for the Base project with ability to expand for the full program of Base+Core+Options+AGS.
- Coordination with CDOT for ongoing improvement projects, including peak period shoulder lanes and the Twin Tunnels project.
- Planning and design of a bus transit network plan and initial operations start-up. This plan would be developed in conjunction with the communities along the Corridor.

The phasing of the program was designed using a series of findings and assumptions:

1 Negotiations with FHWA to execute one or more Section 129 agreements will allow CDOT to begin tolling when the project development process begins for each gateway location. Toll revenues will pay for Project Development work (PE, NEPA, and CSS/PI activities).

2 User-fee Corridor concept and the tolling program structure is approved in Phase 2 (Milestones 2 and 3).

3 PE/NEPA work for the Base project improvements to existing EJMT and to implement tolling at the tunnel would be done in Phase 2. CSS/PLT input is assumed to be reached as Milestone 4.

4 NEPA clearance will be completed by the CDOT/Co-Developer team depending upon the agreement with FHWA. Part 2 explains in more detail that the NEPA clearance work cannot be done with any bias that could be introduced by an incentive for the project to move forward. A separate way to account for that work or to have it done by CDOT will be required.

5 To provide the ability to manage travel demands throughout the Corridor, the I-70 program will be linked to the existing and future ATM and ITS network in the Corridor. In Phase 1, we will develop an integrated Corridor Concept of Operations that builds on the previous work by CDOT statewide and along I-70.

6 Phase 3 presents a summarized series of steps to procure the P3 concessionaire. The process will start with the NTP and will move forward as decisions are made by CDOT and FHWA. Milestones consist of the following:

- M-5 will result in a shortlist of qualified parties
- M-7 will end the industry review and issue the final RFP
- M-8 AGS feasibility determination
- M-9 will conclude with the selection of the preferred concessionaire
- M-10 will be the execution and close of the contract with the concessionaire. This action will trigger payments to CDOT and will authorize the concessionaire to proceed with implementation of the Base improvements to EJMT.

7 The Program Phasing shows a uniform “block” for the activities in Phase 4 – Project Development. A detailed schedule is presented in Section 6.2.3 to show assumed durations by specific project.



Scoping Level Cost Estimate

Table 6 presents a summary of the Total Project Costs and the Annual Operating Costs estimated for each element. These results are used in Section 6.3 Financial Plan.

Design and Construction Challenges

As we developed our Project Plan and the overall program approach, we carefully considered the design and construction challenges that would be presented by each project. Table 7 presents a summary of those challenges, arranged according to our Base, Core, and Options structure for the concession contract.

Corridor Concept of Operations and Active Traffic Management

The ATM system will provide real-time travel condition information to improve safety and reduce congestion along the Corridor.

Our experience and lessons learned will save CDOT time and money, as we will build upon and enhance the existing system rather than designing an entire new system. We also offer the added benefit of providing all driver source code to CDOT so that future updates to the CTMS can be accommodated; this will allow CDOT to control the device provided by the project team, should they want that control. If CDOT prefers, the concessionaire could provide the operator for monitoring and activating the system to maximize revenue collected and decrease

the overall time for completing the roadway improvements. We will have already completed the process of assisting with the system integration of the enhanced ATM elements into the CTMS as part of the U.S. 36 project.




Laycee Kolkman actively tracks emerging policy and planning initiatives at the local, regional, state, and federal levels. This knowledge, coupled with her experience and instinctive interpersonal skills, will help guide the planning group while making use of valuable existing information throughout the state.

Gateway and Managed Lane Toll Collection Facilities/Systems

We will work closely with CDOT to plan for and specify a fully integrated system for the toll system and the managed lanes, providing Active Traffic Management, electronic toll collection, and bus-on-shoulder capabilities.

The tolling system will have dynamic capabilities, allowing CDOT or the concessionaire to adjust toll rates to encourage or discourage users to optimize

revenue/reduce congestion along the Corridor and maintain the flow of traffic in the managed lanes.

ITS Management Concepts

We will develop an ITS system design that leverages the existing investments by CDOT and minimizes long-term maintenance costs. We will evaluate the placement of ITS/ETC/ATM devices required for the project and consolidate devices where possible. Real-time traffic data will be collected from ITS components such as cameras and speed sensors, which will relay that data to the new Traffic Management Center or to the existing TCMC with the aid of a local operator. ITS devices will be strategically designed to enhance safety along the Corridor.

Traffic Maintenance and Control During Construction

The MOT plan will include a construction phasing plan that maximizes all general purpose and auxiliary lanes, avoids impacts, and maximizes interchange capacity. Shoulder lanes will be provided during construction and, where not feasible, emergency turnouts will be provided to improve access in and out of work zones, reduce lane closures, and improve safety through reduced interaction between construction traffic and the traveling public.

Traffic plans will maintain the existing number of lanes at all times. Installation of facilities such as toll gantries will be accomplished at night and other non-peak period times. When planning each

Table 6 Summary of Total Project Costs & Annual Operating Costs

Project ID	Tunnel or Highway Element	Total Project Cost (\$M)	Annual Increased O&M Costs (\$M)		
			Additional O&M Cost (2)	Toll Collection O&M (2)	Annual Capital Reserve (2, 3)
BASE BID (B)					
0	Toll Collection System and Rehabilitation of Existing EJMT	\$18	No Change (1)	\$2.00	N/A
BASE PLUS CORE (B+C)					
6	Eisenhower-Johnson Memorial Tunnel Third Bore	\$800	\$2.00	\$1.00	\$0.25
8	a) WB Twin Tunnel Widen to 3-lanes	\$52	\$0.00	N/A	\$0.00
	b) WB Widen to 3-lanes to Top of Floyd Hill	\$135	No Change (1)	N/A	No Change (1)
	c) Curve Safety, East of Twin Tunnels		<i>CDOT Project</i>		
	d) U.S. 6 Clear Creek Interchange	\$35	No Change (1)	N/A	No Change (1)
	e) EB/WB Toll Collection	\$1	N/A	\$2.50	N/A
13	Traffic Operations Center	\$30		N/A	N/A
14	ITS/ATMS/ATTS	\$10		N/A	N/A
BASE PLUS CORE PLUS OPTIONS (B+C+O)					
1	S.H. 131 Wolcott Junction Interchange	\$1	No Change (1)	\$0.10	No Change (1)
2	a) Dowd Canyon Curve Safety	\$113	No Change (1)	N/A	No Change (1)
	b) U.S. 24 Minturn Interchange	\$14	No Change (1)	N/A	No Change (1)
	c) Toll Collection	\$1	N/A	\$2.50	N/A
3	S.H. 191 Copper Mountain Interchange	\$1	No Change (1)	\$0.30	No Change (1)
4	S.H. 9 Frisco Interchange (including toll implementation at Frisco Main Street Interchange)	\$9	No Change (1)	\$0.60	No Change (1)
5	S.H. 9 Silverthorne Interchange	\$18	No Change (1)	\$0.30	No Change (1)
7	U.S. 40 Empire Interchange	\$7	No Change (1)	\$0.20	No Change (1)
9	EB/WB Aux Lanes Vail Pass	\$216	No Change (1)	N/A	No Change (1)
10	EB Aux Lanes, Frisco to Silverthorne	\$9	No Change (1)	N/A	No Change (1)
11	EB Aux Lane, EJMT to Hermann Gulch WB Aux Lane EJMT to Bakerville	\$66	\$0.20	\$0.75	\$0.35
12	WB Peak Period Shoulder Lane, Bakerville to Twin Tunnels	\$33	<i>CDOT Project</i>		
	Totals	\$1,569			

1. No measurable change over existing system or to be covered by CDOT as part of overall maintenance program for existing I-70 Mountain Corridor
2. Additional O&M cost to be covered by concessionaire
3. Annual capital reserve to cover major repairs, pavement rehabilitation and replacement, etc

Table 7_ Summary of Design and Construction Challenges

ID	Project	Design Challenge	Construction Challenge
BASE BID (B)			
0	Toll Collection Facilities and Rehabilitation Existing EJMT		
BASE PLUS CORE PROJECTS (B+C)			
6	EJMT Third Bore	<ul style="list-style-type: none"> Lane balance issues associated with traffic split between three tunnel bores Ability of existing 28 ft wide WB tunnel section to accommodate two-way traffic Ability of existing WB tunnel ventilation system to accommodate two-way traffic 	<ul style="list-style-type: none"> Haul and Disposal of excavated material from new tunnel and phasing earthwork with other projects along the corridor
8	WB Twin Tunnel to Top of Floyd Hill Curve Safety, East of Twin Tunnels US 6 Clear Creek Interchange	<ul style="list-style-type: none"> Lane balance issues along I 70 between Idaho Springs East interchange, Twin Tunnels, US 6 interchange and Floyd Hill Phasing of improvements particularly the new I 70 bridge over Clear Creek and curve safety improvements with respect to the Twin Tunnels and widening to 3-lane section Ability to accommodate future AGS corridor and tunnel section Design of horizontal alignments to minimize rock cuts and impacts to Clear Creek Vertical clearance issues associated with I 70 over US 6 EB off-ramp adjacent to Clear Creek FEMA floodplain elevation Steep embankment fills and/or retaining walls along I 70 WB along Floyd Hill 	<ul style="list-style-type: none"> Maintenance of traffic during construction particularly the reconstruction of the US 6 Interchange and I 70 bridges over Clear Creek
13	Traffic Operations Center		
14	ITS/ATMS/ATTS		
BASE PLUS CORE PLUS OPTIONS			
1	SH 131 Wolcott Junction Interchange	<ul style="list-style-type: none"> Traffic volumes at the SH 131 Gateway may not be sufficient to justify the O&M cost of the toll collection system 	
2	Dowd Canyon Curve Safety US 24 Minturn Interchange	<ul style="list-style-type: none"> Mitigation of both temporary and permanent impacts to Eagle River, Gore Creek and recreation trail Design of new I 70 EB direct on-ramp and steep uphill profile grade on I 70 Potential rock cuts along new EB on-ramp Steep embankment fills and/or retaining wall along I 70 WB Vertical clearance over the UP railroad tracks 	<ul style="list-style-type: none"> Maintenance of traffic during construction on I 70 through Dowd Canyon as well as at the US 24 Interchange will be a significant challenge Construction over and adjacent to the UP railroad tracks
3	SH 191 Copper Mountain Interchange	<ul style="list-style-type: none"> Significant wetland and water quality issues that may impact permitting and schedule Substandard WB loop on-ramp and ability to implement toll gantry 	
4	SH 9 Frisco Interchange (incl toll implementation at Frisco Main St Interchange)	<ul style="list-style-type: none"> Potential for traffic to divert to alternative parallel routes including Dillon Dam Road and Swan Mountain Road to bypass toll collection. Undesirable truck turning radius at existing roundabout on north side of interchange Dense land development and congestion along SH 9 adjacent to the south side of the interchange and operational issues associated with local service roads in proximity to interchange ramps intersections 	
5	SH 9 Silverthorne Interchange	<ul style="list-style-type: none"> Dense land development and congestion along SH 9 adjacent to the south side of the interchange and operational issues associated with local service roads in proximity to interchange ramps intersections 	<ul style="list-style-type: none"> Maintenance of traffic during construction on I 70, SH 9 and US 6 will be a significant challenge
7	US 40 Empire Interchange	<ul style="list-style-type: none"> Substandard EB loop off-ramp Alignment and bridge pier placement of new US 40 bridge over I 70 with respect to existing bridge Potential for traffic to divert to alternative parallel routes along US 6 frontage road network to bypass toll collection. 	<ul style="list-style-type: none"> Maintenance of traffic during bridge construction and proximity of Clear Creek to north bridge approach on US 40
9	EB/WB Aux Lanes Vail Pass	<ul style="list-style-type: none"> Environmentally sensitive area Feasibility of widening existing segmental concrete box girder bridges and reinforced earth retaining walls may require entire replacement 	<ul style="list-style-type: none"> Strict environmental requirements and rugged terrain will present challenging construction staging areas for bridge replacements
10	EB Aux Lanes, Frisco to Silverthorne		
11	EB Aux Lane, EJMT to Hermann Gulch WB Aux Lane EJMT to Bakerville	<ul style="list-style-type: none"> Steep embankment fills and/or retaining walls along I 70 EB and rock cuts along I 70 WB Design modifications to US 6 Loveland on and off ramps to accommodate EB and WB auxiliary lanes 	
12	WB Peak Period Shoulder Lane, Bakerville to Twin Tunnels	<ul style="list-style-type: none"> Feasibility of accommodating 3 traffic lanes within existing 38 ft section Logistics and economy of minor widening of existing roadway at bridge and retaining locations Impacts to sight distance due to shifting lanes and reducing shoulder widths may dictate reduced operating speeds 	



major change in traffic, we will host an informational meeting with local agency representatives, law enforcement, first responders, and other interested stakeholders.

Effects on Emergency Response Services

We will work closely with county and city emergency response agencies to prepare the Concept of Operations Plan and the ATM plan. The plan will include specific requirements for each segment. The first step in incident management involves the detection and identification of an incident. Supervisors in the field will be trained in incident management procedures and will notify the CTMC upon detection of an incident.

Improvements to Other Facilities on or Adjacent to the Corridor

Depending upon the scope and form of the agreement that CDOT, HPTE, and the HDR team negotiate with FHWA, the user fee revenues could be programmed for facilities with related uses. Emphasizing corridor mobility is the primary objective of the improvements. The test for investment will be whether the proposed improvement would contribute to this objective. At the sketch level of plan development, we do not anticipate making other Corridor improvements or improvements that might be considered adjacent. As stated previously, improvements to local service interchanges on I-70 will not initially be considered for implementation because of the

limited amount of user fee revenue that will be generated.

We recommend that CDOT, HPTE, and FHWA set the program priority to improve travel times and reliability through the Corridor. Therefore, user fees could shift travel demands to other modes including bus transit and AGS.

Construction Outreach

The HDR team is very sensitive to the real and perceived impacts from construction on the state's largest east-west connection, which serves as the lifeline to the mountain communities and world class recreation sites. Our construction outreach strategy is proactive, focused on construction impacts and mitigation through an ITF. This ITF will examine the types of impacts to:

- Communities
- Traveling public
 - bicyclists and pedestrians
 - businesses
 - recreation areas
 - agencies having jurisdiction
 - freight movement

The construction mitigation strategies in the PEIS and Twin Tunnels EA will serve as a starting point for the subsequent PLT.

By having an ITF start upon project initiation, the team will be able to explore concerns and actively engage the stakeholders in problem solving.

At the project level, we will identify and coordinate with impacted stakeholders. We will communicate construction timing using:

- Variable message signs
- Electronic communication
- Postings at local recreation businesses, lodging facilities, and tourist attractions.

This will allow people to adjust their travel times. Working with local and regional entities to avoid impacts will be a primary goal, and incentives to continue to travel through and recreate in the Corridor will be investigated.



For example, explore partnering with hotels to encourage guests to stay on weekdays to spread out travel demand and reduce congestion in construction areas on weekends.

During construction, extensive messaging to Corridor users will guide them to their destination. Strategies will be developed at the program level ITF and tailored for each project in coordination with the project level PLT.

How construction will impact travel and life in the Corridor must be openly communicated at both the program and project levels. Traveler and construction worker safety will be considered throughout the process.

Minimizing disruption to the daily lives of residents, the recreation traveler, and freight movement is of utmost importance.

Transit Program

We are committed to the development and operation of a viable transit system for the I-70 Mountain Corridor that will establish a long-term riding culture. The transit system will be implemented incrementally, but the overall objective will be to add elements and make investments that will be compatible over time with the implementation of AGS and that will incentivize a transition from the private automobile to transit use in the Corridor.

The transit system will be composed of four elements:

- **Line-Haul Service:** Reliable line-haul operations from point-to-point in the Corridor. Priority preference for transit vehicles through gateways and along the managed lanes.
- **Circulator Feeder Service:** Connect existing and future services operated by local entities linking to line-haul service. Feeder service thus ensures that the first and last mile of the transit trip are met.
- **Transit Hubs:** Focal points for the communities along the Corridor that will serve as transit centers for line-haul and circulator services.
- **Provision for AGS:** Actions to make implementation of AGS easier in the future. P3 concession structure will provide specific terms related to implementation of AGS.

Operational Strategy for Transit Services

Initial point-to-point service will be established along the Corridor using



Ed Icenolge has been lead owner's counsel in the financing and construction of 56 miles of the Denver metro area tolled beltway and was initial and continuing lead counsel to the tax-supported Pikes Peak Rural Transportation Authority.

a fixed-route structure serving the transit hubs. Transfer connections to the circulator services would be made at the transit hubs. The service would deploy high quality over-the-road coaches because of the superior ride quality and better safety. Daily service would be provided with increased service on weekends. Service would connect ECO Transit in Eagle County to the RTD FasTracks network at Denver Union Station (DUS) and the Jefferson County Government Center. Connections to DIA and Eagle County Airport (ECO) would be provided as the usage grows. A conceptual route layout and potential transit hub locations are presented in Figure 1.

Initial operations would begin with hour headways in each direction during the morning and evening daily peak hours, and run every two hours in mid-day and late evening. Initial service would run

from 6 a.m. to 10 p.m. weekdays and weekends. Using the initial schedule described above, a total of 11 trips in each direction would constitute the initial service.

Transit vehicles would be given priority through the managed lanes, which will include the peak period shoulder lanes and the auxiliary (tolled) lanes. Preferred access to the lanes will also be provided where new structures are constructed. Direct connections to transit hubs will be an important part of making this service effective.

Coordination with Local Transit

Local services in Eagle County, Avon, Vail, Summit County and RTD will be coordinated with the I-70 Mountain Corridor service to ensure transfer capability and fare acceptance. The I-70 Mountain Corridor service could enhance or take the place of two services:

- Eagle County Transit already connects Vail and ECO with the Gypsum Route that runs at least eight times a day. The I-70 Mountain Corridor route could enhance that routing capacity or take the place of that route in the schedule.
- Summit Stage offers service from Frisco to Copper Mountain and Leadville.

Operating and Governance Concept

The Corridor service and operations will be administered by a multi-agency organization established through execution of Intergovernmental Agreements (IGA). We recommend that the organization be composed of the three mountain counties, the RTD, and CDOT.



Eagle and Summit counties could delegate their participation to the existing transit agencies if desired. Clear Creek County will need to determine how to assign participation.

Similar to the work that ISP is completing for the C-470 Coalition, the process to agree on a governance structure will start with a charter and other simple decisions. A board and an administrative structure will be designed with the objective to use existing functions and staff to bring the transit service on line initially.

At this sketch level of transit plan development, we have used the simple metric of route-mileage within each county to serve as a method to divide responsibility (and funding). Of the 135 miles between DUS and ECO, 34% is in Eagle County, 23% in Summit County, 24% in Clear Creek County and 19% in the RTD. The HDR team will conduct a more detailed transit ridership study with the results of the Level 2 T&R Study that we prepare and using the results of the ICS/AGS ridership estimates that are under development. These results will help in understanding future transit demand for service routing and refining the method of assigning responsibility among the parties to the IGA.

Revenue Sources

The line-haul service would be funded by three sources:

- User fees in the form of fares with ancillary sources such as advertising .
- State and federal support as part of the FTA program and

possible CDOT interest in offering intercity passenger service.

- Local support from the jurisdictions along the Corridor to reinforce the priority of transit.

We assume that capital and operating costs would be apportioned among the participants according to the percentages presented above. In this case, CDOT would not have a required percentage in the Local category because a state/federal contribution would be expected.



Doug Jackson has spent the last 11 years managing alternative delivery projects for state transportation agencies and private owners.

Implementation of Corridor line-haul service could qualify for TIGER and Livable Communities grant programs. FTA also offers assistance for bus and transit facility capital costs through grant requests. The HDR team will organize data and rationale for these kinds of grants and will work with CDOT to structure and submit for possible award. Over the past three years, HDR has helped transit agencies win over \$2.5 billion in grants from TIGER, Urban Circulator Grants, and Full Funding Agreements.

Bus Service Performance

Operation of the I-70 Mountain Corridor service will be monitored to ensure that it is performing efficiently and effectively. Standards will include service characteristics such as on-time performance, load factors, passengers per mile, and farebox recovery. By tracking the service and comparing it to these performance standards the service will be modified to ensure that the standards are being upheld.

Relationship between Tolls and Fares

This is an important area of risk to the P3 concessionaire because of the potential change in mode as travelers seek a reasonable price for their trip. In particular, consideration of the potential AGS will be incorporated into all planning for the toll structure because of the high ridership expected. Management of both the fares and the toll rates will be a major part of the negotiation for the concession contract. We tested the sensitivity of the toll rates to transit fares and that information is presented in Section 6.4.

Ridership Triggers for Increased Transit Service

A subset of the service standards developed to monitor the performance of the route, will also be used as thresholds in order to manage the transit service cost-efficiently. These selected service standards would include measures such as riders per trip to determine if trips should be added, and boardings per segment to determine if service should be increased between certain points.

Scoping Level Capital, Operating and Maintenance Costs

Table 8 presents a scoping-level estimate of capital and operating costs for the service. The costs are based on typical costs from RTD and other local services, adjusted for the line-haul character of this service.

The initial fleet would consist of eight vehicles and two spares. Over-the-road coaches would be used; the expected cost for each vehicle would be \$850,000 for a total of \$8.5 million. Maintenance and road supervisory services would be contracted with one or more of the existing transit agencies in Eagle or Summit County or in Front Range.

Stations and Transit Hubs

Transit hubs would be established as focal points for service connections. Several already exist in Eagle, Edwards, Avon, Vail, Frisco, Silverthorne Evergreen, and Denver. New transit hubs will be established in Georgetown and Idaho Springs at a minimum. These hubs will be an integral part of the transit network that could support Corridor AGS stations. These locations will need to be central and large enough to accommodate minimum platform lengths of 1,000 feet. OV Consulting will lead the work of our team in this area to continue to coordinate and advance siting of transit hubs, AGS stations, and the transit network.

One of the key parts of the transit hub planning is to assess the importance of Transit Oriented Development (TOD). Coordinated planning can help to make the transit/pedestrian system work to full advantage, serving to encourage mode change and reduce traffic demand on I-70. With integrated planning, the potential for TOD revenues to help support transit capital and operating costs is also available.

Compatibility of Bus Transit Plan with Base Case

Implementation of transit service that provides reliable and consistent Corridor service is the first step in getting the traveling

public to change modes. An initial bus service planned and operated in the line-haul configuration and supported by local circulator connections is the best opportunity to transition to a successful and recognized service and establish network connections that could support future AGS. This step is fully consistent with the ROD, and as such is consistent with the Base Case outlined in the RFP.

6.2.2_Tier 2 NEPA

The HDR team Tier 2 NEPA studies approach is focused, collaborative, and tightly managed. Our approach has two basic components, as highlighted on the following page.

Station/Stop	Dist.	Cum. Dist.	AM Peak	Mid-Day	PM Peak	Eve	Total Trips	Total Mileage
Eagle County Airport	0	0						
Edwards Main Street	21	21	6	6	6	4	22	462
Avon TC	4	25	6	6	6	4	22	550
Vail TC	10	35	6	6	6	4	22	770
Copper Mountain	22	57	6	6	6	4	22	1254
Frisco TC	6	63	6	6	6	4	22	1386
Silverthorne TC	4	67	6	6	6	4	22	1474
Georgetown TC	23	90	6	6	6	4	22	1980
Idaho Springs TC	15	105	6	6	6	4	22	2310
El Rancho PNR	8	113	6	6	6	4	22	2486
Genesse PNR	3	116	6	6	6	4	22	2552
C-470/Jeffco Govt.	6	122	6	6	6	4	22	2684
Denver Union Station	13	135	6	6	6	4	22	2970
	Runs	Headway						
AM Peak is 6 to 9	3	1 hr						
Mid-Day Peak is 9 to 3	3	2 hr						
PM Peak is 3 to 6	3	1 hr						
Evening Peak is 6 to 10	2	2 hr						
Total Runs Per Direction	11							
Non Rev Miles (10%)								300
Total Daily Bus Miles								3300
Cost/Bus Mile								\$8
Daily Ops Cost								\$26,000
Annual Ops Days								365
Annual Ops Cost								\$9,500,000

Source: HDR; 2012

A PROGRAMMATIC, CORRIDOR-WIDE ENVIRONMENTAL RESOURCE TEAM

1 A programmatic, Corridor-wide Environmental Resource Team (ERT) will be initiated immediately after receipt of Notice to Proceed in order to develop standard methodologies, clarify CDOT Region 1, CDOT EPB, and FHWA roles and responsibilities, initiate resource agency coordination, and clearly outline schedule and scope for any regulatory sign-offs. This approach is patterned after the FasTracks Program where a similar group developed methodologies and procedures which were then implemented on the eight Corridors. The I-70 ERT will include individuals with specific expertise in the key regulatory areas of Section 4(f), Section 404, Section 7 (of the Endangered Species Act), Section 106 of the National Historic Preservation Act and Land Use/Environmental Justice. The ERT will include CDOT and FHWA environmental personnel, as well as key representatives from state and federal resource agencies. These individuals will develop methodologies, lead resource agency coordination, and continue to serve as a resource during the project-specific studies in order to take advantage of any efficiencies in processes, standard mitigation approaches, and other programmatic type agreements developed with the federal and state agencies.

PROJECT SPECIFIC NEPA PROCESSES, ANALYSIS, AND DOCUMENTATION

2 The ERT will establish the basic procedures to be followed by different teams as the project-specific NEPA processes are implemented. The project-specific NEPA processes will use as a framework the purpose and need, alternatives, resource information, and mitigation strategies developed during the Tier 1 Programmatic EIS. These different teams will be partially staffed by HDR personnel and partially by other consultants. The ERT will continue to provide guidance and direction as the project-specific NEPA processes proceed. Gina McAfee's involvement in managing the Twin Tunnels EA will be instrumental in assuring an adequate tie back to the Tier 1 commitments.

auxiliary lanes on Vail Pass, Frisco to Silverthorne, and east of the EJMT – both lanes).

- Bus improvements (operations, stations, queue jumps, etc.).

Each of these minor Tier 2 processes will include the standard NEPA steps of definition of purpose and need, alternatives analysis, and documentation of impacts and mitigation. Each will tie back to the Tier 1 document. Coordination with CDOT, FHWA, and other state and federal resource agency coordination will be done.

Other Tier 2 clearances that would be required include likely EISs for:

- Westbound I-70 widening from the top of Floyd Hill to the east Idaho Springs exit.
- Third bore of the EJMT.
- Westbound peak period shoulder running improvements in Clear Creek County.

These processes will be more involved than the minor NEPA processes. The timeline for these is shown in Figure 5. HDR's approach of using the ERT to develop programmatic approaches to these EISs will assure their streamlined completion. The HDR team will manage these more complicated projects. Careful merging of CSS with these NEPA processes will save time and money.

The scope of technical environmental studies needed to support the Tier 2 clearances is carefully outlined in the Tier 1 I-70 FEIS and ROD. The most critical of these include Section 4(f), Section 404, Section 7, Section 106 (to be conducted in compliance with the

Tier 2 clearances for minor improvements involving EAs or Categorical Exclusions (either traditional or Documented) include the following actions:

- Early tolling program/gateway toll collection.
- Gateway/ interchange improve-

ments at Wolcott/S.H. 131, U.S. 24/Minturn, S.H. 191/ Copper Mountain, S.H. 9/ Frisco, S.H. 9/Silverthorne, U.S. 40/Empire Junction, U.S. 6/Clear Creek.

- Other safety improvements (curve safety east of Twin Tunnels and in Dowd Canyon,



Programmatic Agreement), water quality (including SWEEP coordination), and wildlife and fisheries (including ALIVE coordination).

Many of these technical environmental studies require development of alternatives to avoid or minimize impacts to particular regulated resources, so the specific regulatory requirements will be folded into the Tier 2 studies.



Gina McAfee served as the NEPA expert for the Collaborative Effort team. She led the CSS and NEPA process merging for the Twin Tunnels EA project.

Necessary permits and other approvals can be critical to cost and schedule control for the individual projects. Permits and approvals that are most critical include:

- Section 404 permits, especially if an individual Section 404 permit is needed
- HB 1041 approvals, which will be initiated as early as possible and carefully addressed through the CSS process
- CDPHE permits, with the dewatering permit potentially requiring the most time

Coordination with the Collaborative Effort and full implementation of CSS commitments will be folded into the NEPA processes and other life cycle stages of the various projects.

CSS Process

The HDR team will implement the CSS Guidance at two levels: the program level and the project level. At the program-level the PLT and ITFs will address Corridor-wide issues including user fees, construction impacts, and transit service. Project teams will focus on the impacts and design considerations of a specific improvement. The ALIVE and SWEEP committees will also be convened to participate in the program-wide CSS efforts, including feasibility and project development phases.

In order to facilitate efficient, inclusive implementation of Corridor improvements, the HDR team will initiate the program-level PLT immediately to begin work on the Corridor level topics of interest.

Both the program-level and project-level PLTs will be information intense and require commitment of team members to actively strive to move the program forward. Basic tenants of transportation planning, design, and operations will be explained as most PLT members are unlikely to have this background. The need to strike a balance of the core values, which include mobility and safety, will be a constant theme throughout the program. Both PLTs will also report to the Collaborative Effort team when it meets and will also serve as ambassadors of their project to the greater public.

The program-level PLT will be maintained throughout the duration of the Corridor improvements. This group will address broader issues common to most or all of the projects within the Corridor. ITFs will take specific issues needing more detailed examination offline to allow the rest of the program to proceed. For example, the HDR team will offer the program PLT the option to create an ITF for bus transit operations.

The project PLTs will be established for site-specific improvements and will be comprised of local and jurisdictional agency representation, resource experts, and local stakeholders. They will focus on the core values, impacts, and design related to their specific project. They may request creation of ITFs or that a concern be elevated to the program-level PLT if it has the potential to impact other projects, the program





timeline, or is common to other projects. The project-specific PLTs will meet regularly throughout the life of the project.

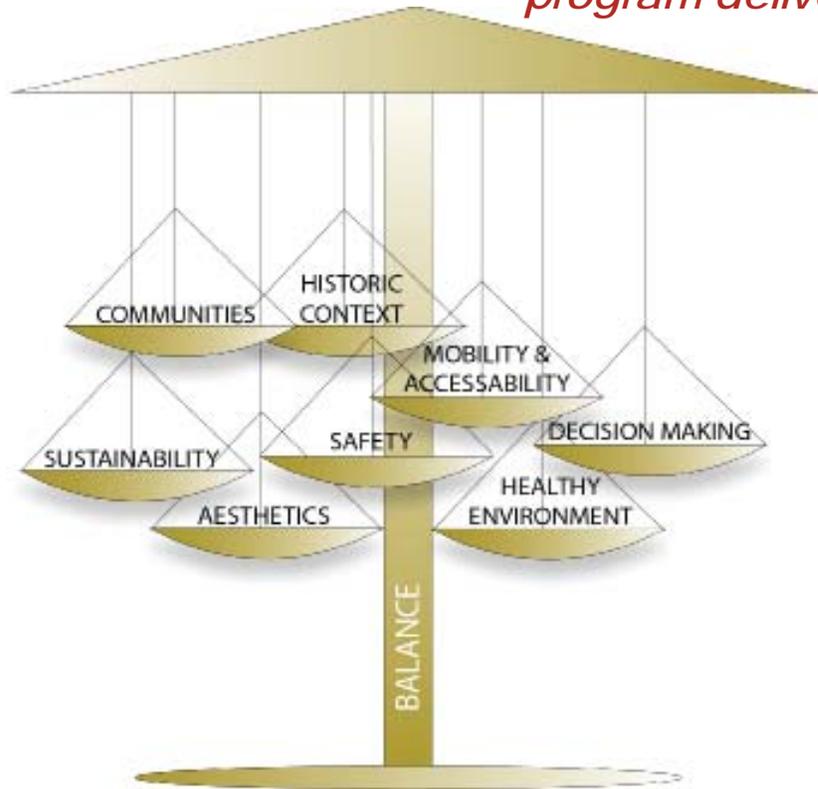
We recommend that CDOT clearly and unequivocally state the level of authority vested in project leadership teams, project managers, and agency leadership for the major decisions on the horizon. In addition, CDOT should specify who will provide input and in which venue. Finally, CDOT should describe whether the desired input is a consensus recommendation or input from those with divergent views that the decision makers will use and, if possible, reconcile.

Valuable lessons learned from direct I-70 Mountain Corridor project experience are:

- 1** It is critical that the various CSS teams be led by a strong facilitator so those processes do not result in delays or cost overruns.
- 2** Roles of the various teams need to be carefully defined.
- 3** Schedules and budgets must be adopted, discussed, and adhered to.

We also recommend identifying the values and decision-making criteria at the start of each PLT including budget and schedule as appropriate, as was done as a part of the Twin Tunnels EA. Adding an explicit commitment to schedule and cost—two funda-

Our CSS approach respects the I-70 Mountain CSS core values while actively focusing involvement to embrace program delivery.



mental decision-making elements for the agency—greatly improves the level of transparency (another value stated in the I-70 Mountain Corridor CSS documents).

Should a specific topic or issue stall in the PLT, the HDR team will provide the technical information or forum for it to be further examined; however, the project schedule will continue to advance. Should a PLT choose to spend time further investigating an issue, the project will not be halted. The project timeline and decision points will be established during the chartering session and will be strictly adhered to. This does not mean that the stakeholder input is not valued, rather that the PLT along with the traveling



Amy Kennedy played a key role in the development of the CSS Guidance and led the PEIS PLT. Her previous experience working with key Corridor stakeholders makes her a perfect fit to lead the CSS processes.



public, interstate commerce, and CDOT all have a shared need for a safe, operational Corridor.

HDR views the CSS process as an opportunity to inclusively advance improvements that benefit all Corridor users. By identifying all benefits, and not simply focusing on the impacts or hurdles, we will demonstrate a clear need for each project and how it will enhance the Corridor. Improvements will be designed and implemented in reflection of the core values to deliver a transportation Corridor that is not only functional, but context sensitive to the surrounding environment and its users.

Our proposed communication and outreach strategy to engage the general public during all phases of project development includes regular updates to the Collaborative Effort, development of PLTs and Technical teams, and formation of SWEEP, ALIVE, and 106 teams. Invaluable to this merging of CSS, are the previous works of HDR’s NEPA and CSS task leads, Gina McAfee and Amy Kennedy, as well as our Stakeholder lead, Mike Hughes.

6.2.3_Implementation Schedule

An overview of our Co-Developer program was presented previously in this proposal. This section will focus on the individual projects that compose the Base, Core, and Options for the program. The improvements are organized into 15 separate projects. Figure 5 presents the overall schedule that is a best estimate of an aggressive

program that would be followed by a concessionaire. As described in **Section 6.4.7 Strategy for Procuring P3 Concessionaire**, the timing for the “Option” projects

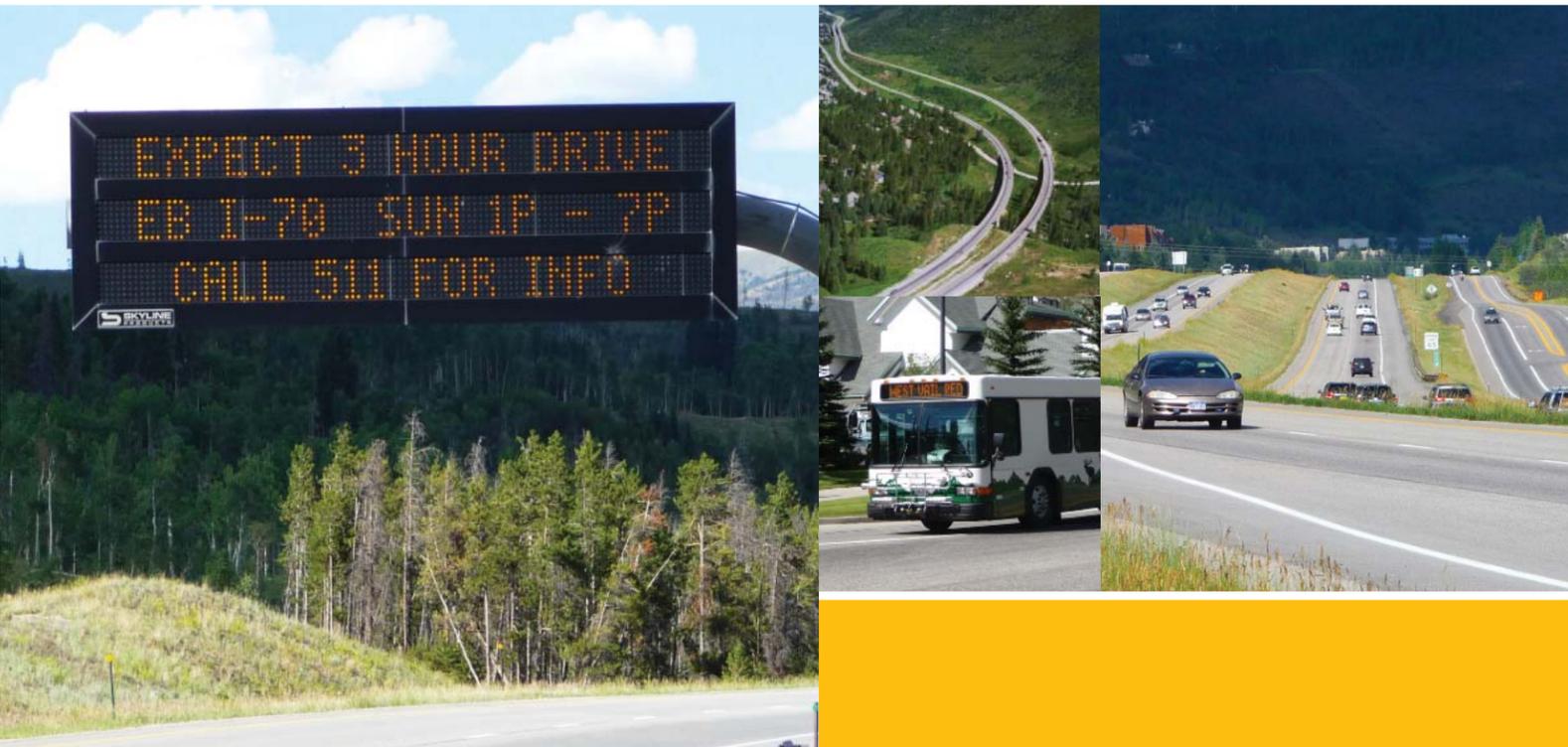
would allow some flexibility for the concessionaire to match timing of improvements with expenses and revenues.

The schedule shows that the program of specific projects would be completed over a seven-year period following a reasonable series of assumptions consisting of:

- 1 Time required to complete projects was evaluated using:
 - Complexity
 - Costs and financing plans
 - Third party conflicts
 - Right-of-way required
 - CSS/PLT process risk
 - MOT and construction phasing
- 2 Most projects would follow a typical sequence of Toll Implementation, NEPA/Preliminary Engineering, Final Design, Construction, and Testing/Start-up/Operate.
- 3 At contract close with the P3 concessionaire, the NTP would be given for Project ‘0’ to install erection of toll facility gantry at EJMT and DB for the tunnel update and rehab.
- 4 NEPA/Preliminary Engineering by CDOT and the HDR Co-Developer would be initiated for the two Core projects of EJMT Third Bore and Twin Tunnels/US 6/Floyd Hill simultaneously with contract close with the concessionaire. Funding to support these activities would be made at contract close.
- 5 CDOT and the HDR team would complete work to design and approve a start-up bus transit program this period as Project 15.
- 6 Tolling at Twin Tunnels would start with the NTP to the concessionaire to begin the Core projects.
- 7 Depending upon the performance and the capacity (both construction and financial) of P3 concessionaire, Option projects could start in the period beginning about three years after the contract close. Start dates would be negotiated.
- 8 Addition of the auxiliary lanes is dependent upon timing of the gateway improvements. For example, work on the Third Bore at EJMT would need to be completed before the EB and WB auxiliary lanes (Project 11) because of the need for lane balance through the segment. Auxiliary lanes would be managed lanes with peak period tolling.

6.3

PROJECT AND RISK MANAGEMENT APPROACH



6.3_Project and Risk Management Approach

6.3.1_Co-Development Management Relationship

Our wide range of experience assisting state DOTs to plan and implement alternative delivery programs provides us with a number of lessons learned as well as tools and techniques that we will employ on the I-70 Mountain Corridor. While we have found that the key to success is to be prepared to address the uncertainty that comes with any program, the size and complexity of programs like I-70 Mountain Corridor requires attention to details in several phases of the program, including:

- Management structure
- Relationship to CDOT staff and management
- Management evolution over time

Co-Developer Management Structure

Our organization chart presented in Section 6.1 demonstrates that the HDR team is committed to forming a strong working partnership with CDOT and HPTE. We will collaboratively identify solutions and share in the risks associated with creating a process that will result in a contract with a P3 concessionaire.

In order to accomplish this objective, we will form an integrated CDOT-HDR team that pairs HDR staff with CDOT managers to provide the overall management, business

management, risk management, and project development management required to successfully deliver the program. This will accomplish the following in each of these areas:

CO-DEVELOPER MANAGEMENT

1 This is the leadership team that will be directly responsible to CDOT, HPTE, FHWA, and the stakeholders on each component of the program. The leadership team is the central point of control and will be led by Rick Pilgrim as the Program Manager and by Doug Jackson as his Deputy. Amy Kennedy and Mike Hughes will lead CSS/Stakeholder Involvement, reporting directly to Rick and Doug because of the importance of achieving stakeholder understanding and support. Project controls will also report directly to Rick and Doug, providing continuous reporting and feedback on progress and performance. Representatives from FHWA will be an important member of this leadership team as well.

BUSINESS MANAGEMENT

2 This group will focus on the commercial, financial, and legal elements that will be necessary to describe and implement the process to procure the P3 concessionaire. The group will be led by Kern Jacobson, who has several decades of experience in project implementation, finance, and procurement. His team will be comprised of key resource leaders, including Garey Foyt. We will pair these managers with specific CDOT staff to ensure communication and execution of each task.

RISK MANAGEMENT

3 We have separated this group in order to provide the objective review and analysis that is essential to identifying, tracking, and resolving or mitigating risks to the program. Led by Ken Smith, who has more than 30 years of experience in preparing and conducting risk management programs, including the risk management program for the Eagle P3 project, this team will be able to focus on processes and anticipate problems before they occur.

PROJECT DEVELOPMENT

4 Led by Steve Long, who has more than 25 years of CDOT and major transportation project design experience, this team will concentrate on project improvements that make up the Minimum Program and will be the foundation of the scope of work of the P3 concessionaire. We are proposing a close working relationship with CDOT staff. Gina McAfee, Steve McQuilkin, Laycee Kolkman, Jeff Stapleton, David Jurich, Bruce Tonilas, and Luara Lutz-Zimmerman who live and work in Colorado and are familiar with CDOT projects.

HDR continually uses broad-based communication and non-traditional techniques to deliver successful programs around the country.

● ● ●
For example, the \$1.3B OBDP included the repair and replacement of over 400 bridges across the state. Comprehensive communication to obtain regional and local input from stakeholders allowed HDR and ODOT to deliver the program while beating delivery expectations.

Program Evolution

The work to achieve financial close and execution of the contract with the P3 concessionaire will require close coordination among CDOT, HPTE, HDR, and the concessionaire. The working relationship is depicted in Figure 6 and will be compliant with Colorado state law.

Ed Icenogle and Tamara Seaver of ISP advised highway clients for E-470, Northwest Parkway, and Jefferson Parkway; they have established working relationships with staff at CDOT, HPTE, and the State Attorney General’s Office that will be required for successful completion of this phase.

In addition, if outside counsel is found to be necessary, CDOT and HPTE can interview and choose from three candidate firms HDR has identified.

Work Location

We propose to co-locate with CDOT staff for the duration of the program. We suggest setting up the initial program office within space available at CDOT, in a location such as the Foothills Residency Office. Once the program and schedule of work are better defined, it may be determined that a separate office space is required, which we will work cooperatively with CDOT to identify.

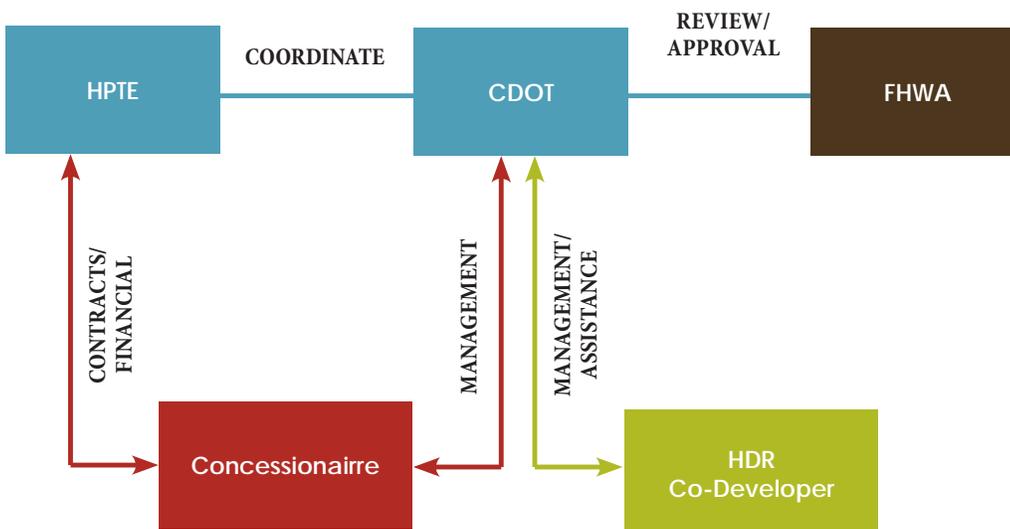
6.3.2 Project Budget Management

The HDR team will have a dedicated Project Controls Manager, Michael Digregorio, working directly with Rick Pilgrim. Keeping CDOT informed with regular updates of actual and projected costs is part of our management work plan and approach.

Primavera 6 (P6) and Contract Manager software will be the core systems for schedule and budget management respectively. The HDR team will create and maintain the following:

- Comprehensive master schedule and accompanying Work Breakdown Structure (WBS).
- Individual project schedules for each phase of the project.
- Schedule control system using the P6 web interface for compliance tracking.
- Cost tracking system
- Program budgets

Figure 6 Functional Working Relationship for Implementation



● ● ●
For example, Gina McAfee will work closely with David Singer and other CDOT specialists to define the approach and work plan for NEPA analyses on each specific project.



6.3.3 Project Phasing, Sequencing and Scheduling

Although we have identified more than 30 individual tasks for Phases 1, 2, and 3, our project plan is defined by a series of 10 milestones. These milestones indicate where the key decisions will be made to advance the program. Figure 7 presents these milestones in a flow diagram illustrating the relationships among the tasks where policy and program decisions will be made. By outlining the flow and decision milestones, our management team will be able to anticipate input required for decision-making. The flow diagram also shows the categories of risks that will be present at each milestone. Recognition of these risks and possible mitigation will allow proactive management by HDR and CDOT.

Master Schedule

Maintaining a master schedule for the entire program allows us to identify specific sequencing and coordination issues that must be handled to allow each project to progress according to the overall plan. The master program schedule will integrate all phases of the program. It will be continuously refined and updated as the work progresses. The schedule highlights significant design, administrative, financial and operational construction milestones. A top-level summary P6 schedule is presented as Figure 8. The schedule shows the seven program phases that HDR would be responsible to complete.

The HDR team will work extensively to address risk elements relative to the process, including:

- DECISION-MAKING**
Continuation of the CSS process, appointment/engagement/response to PLT, and consistency with the PA/ROD or adequate rationale for proposed changes.
- COMMUNICATION**
Continuation of an effective communication program for stakeholders, communities, organizations, businesses, and land owners.
- LOCAL AGENCIES**
Review and approval related to Colorado law regarding user fees and other components of the overall program concept.
- AGS**
Results of the AGS Feasibility Study and the implications of those findings.
- STATE ACTIONS**
Legislation, state agency coordination, and other actions that could affect the overall program.

● ● ●

These strategies have led to clearer means of identifying and allocating risks and more expedient means of resolving disagreements that may develop between parties.

6.3.4 Risk Management

The critical objective in producing a successful alternative delivery program is the removal of uncertainty in each step. This is important because, as the procuring agency, CDOT must provide enough definition and clarity about the program to attract concessionaires who will be willing to commit money at risk for an expected return.

The HDR team experience on more than 150 different assignments to assist transportation agencies with alternative delivery projects equips our team with the knowledge and methods necessary to be a successful co-development partner with CDOT on the I-70 Mountain Corridor. We have led industry efforts in the advancement of improved contracting practices and played prominent roles in the evolution of Risk Management tools and methods such as Geotechnical Baseline Reports and Dispute Review Boards. These strategies and methods have led to clearer means of identifying and allocating risks and more expedient means of resolving disagreements that may develop between parties.

To make sure risks are properly identified and handled, HDR will organize and facilitate an initial risk definition and strategy workshop to be held in the first 15 days of our work. At this first facilitated risk workshop we will review the proposed implementation program methodology with a focus on the milestones/decision steps that must be addressed. Documentation and tracking of risks using a Risk

Figure 7_Project Milestones

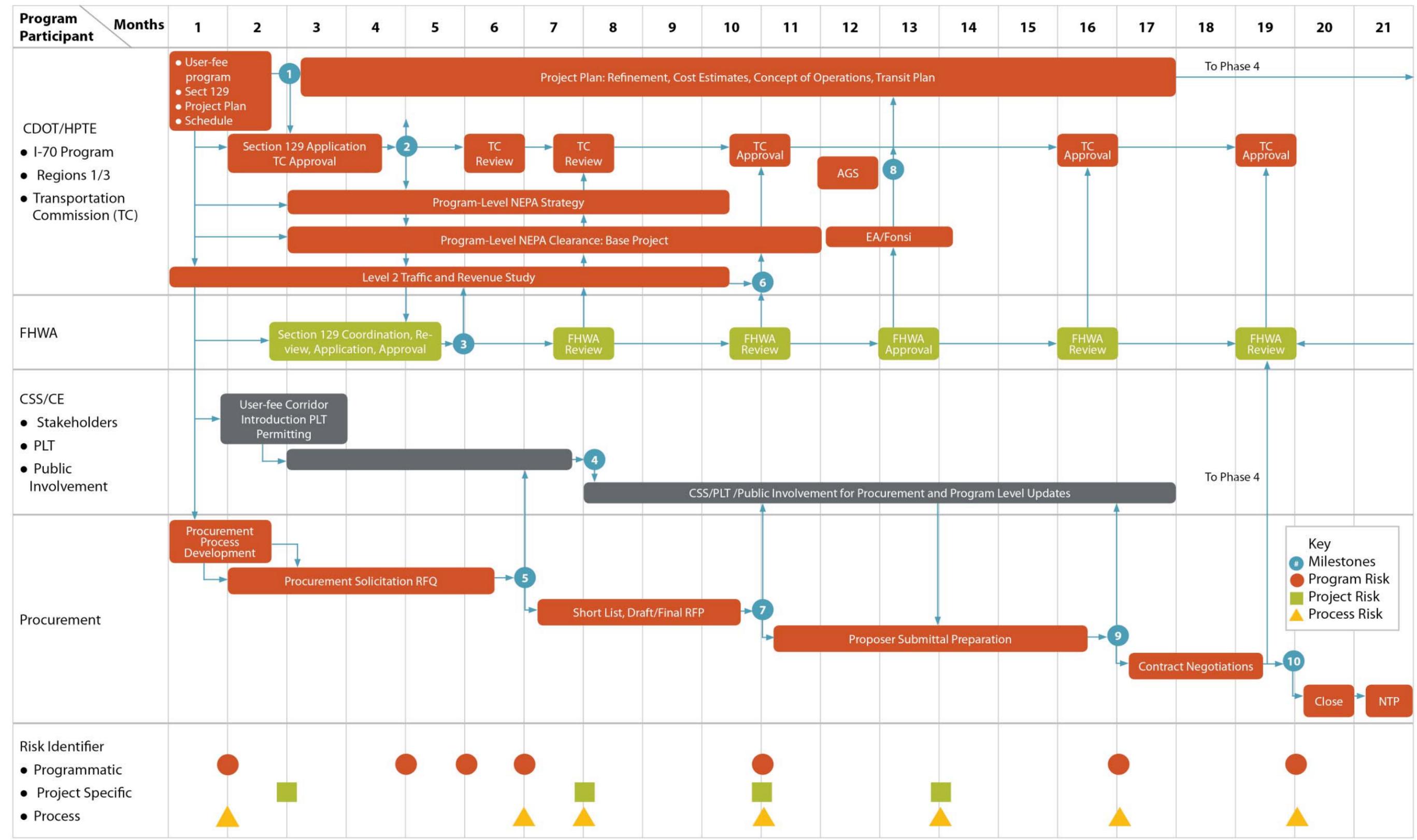


Figure 8_Project Phasing Sequencing Schedule

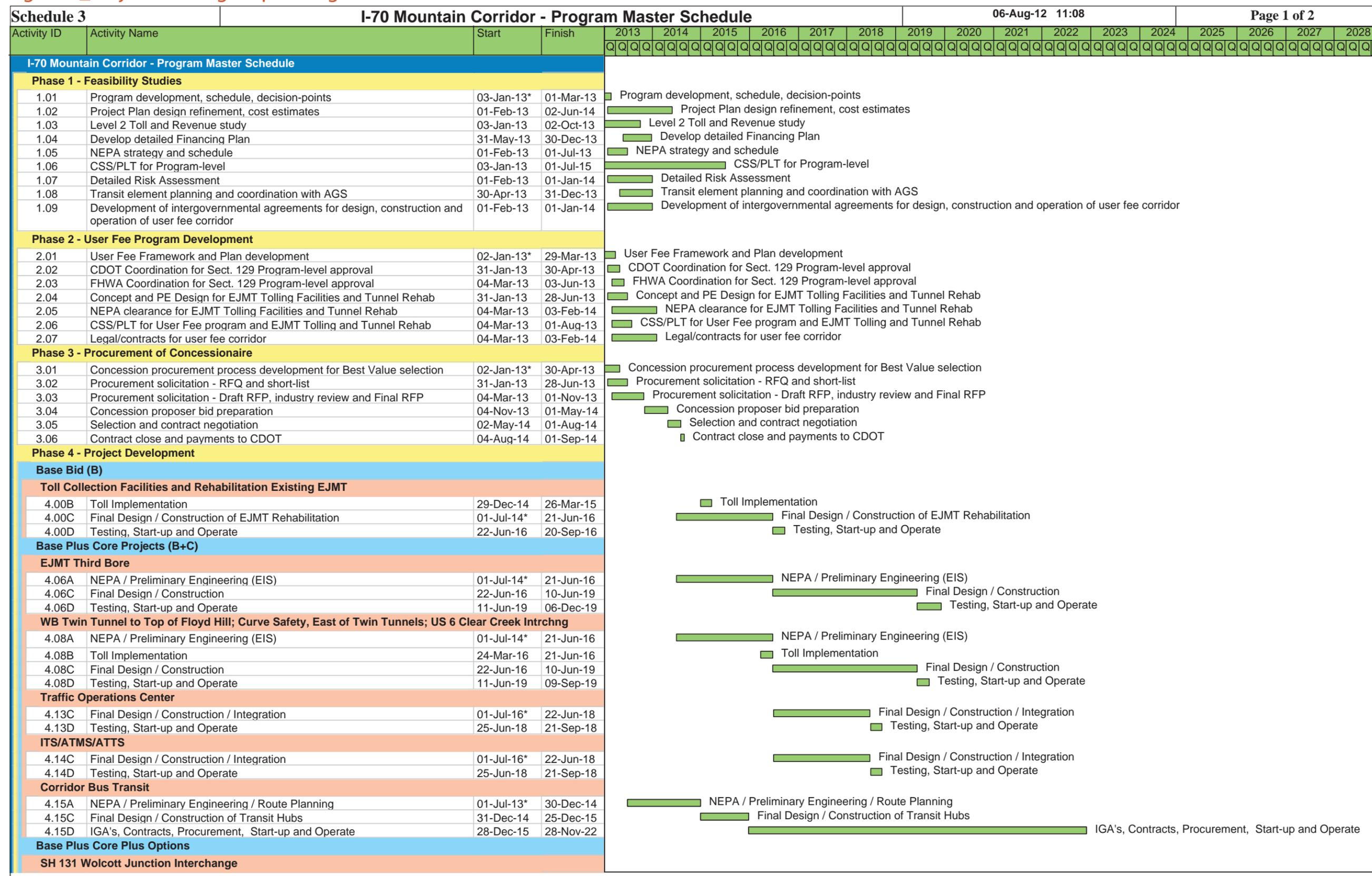
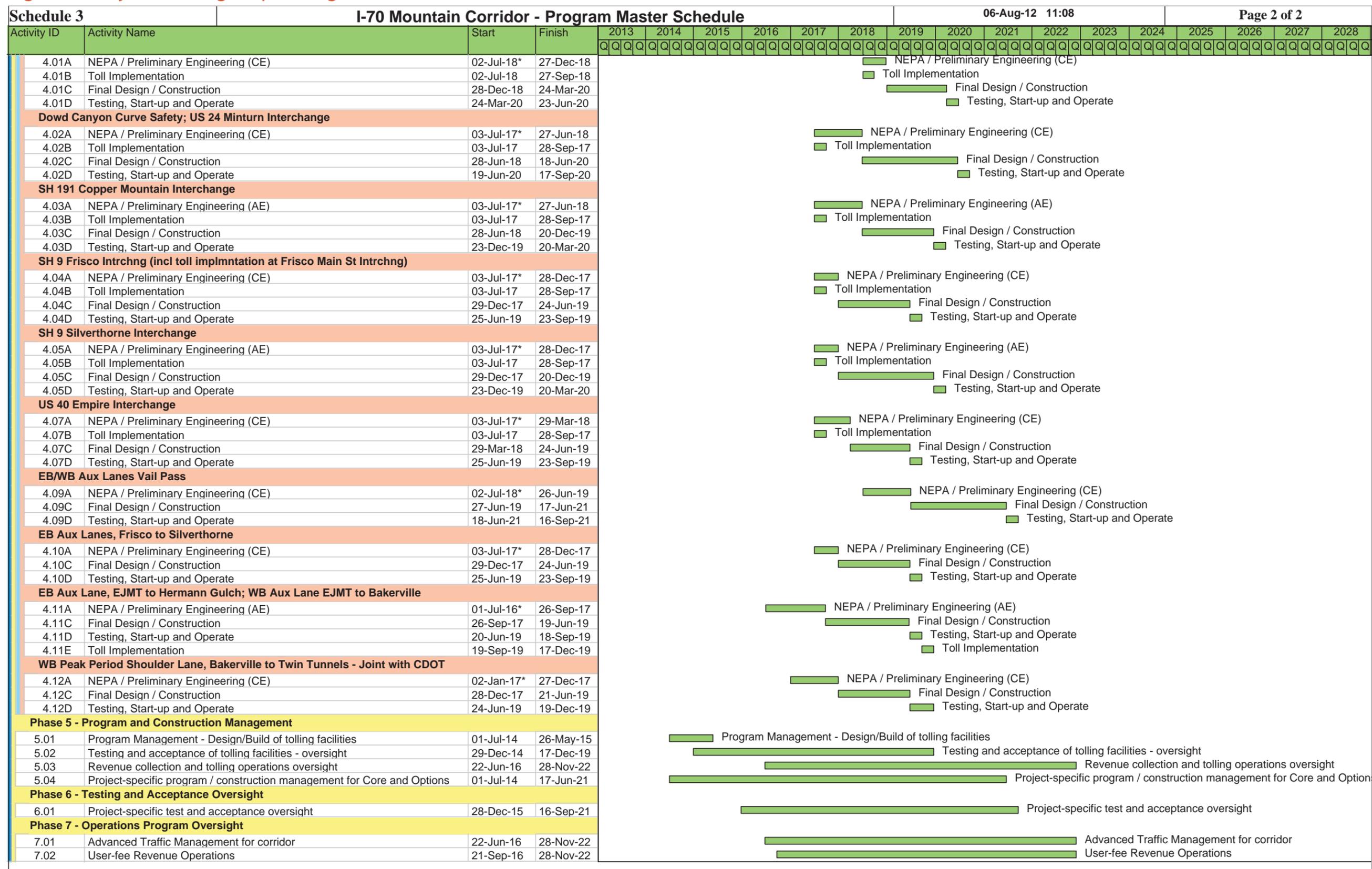


Figure 8_Project Phasing Sequencing Schedule (continued)





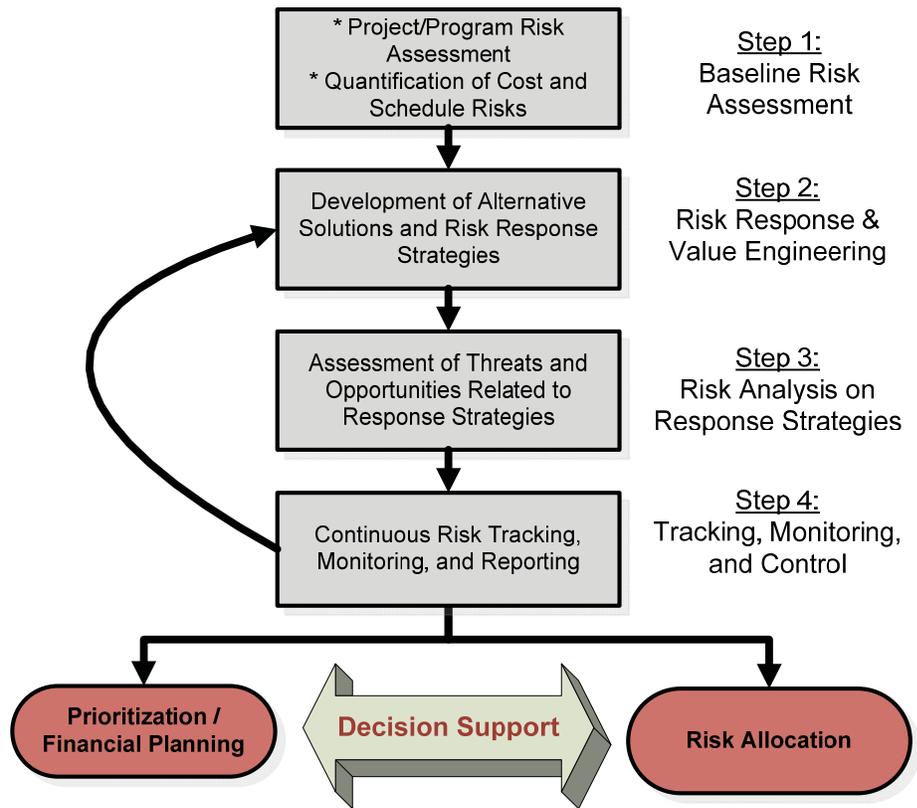
Register is discussed in greater detail below.

During Phase 1 the HDR team will validate each element of the proposed program and its effect on risks, including cost and schedule. We plan to do this by using HDR’s proprietary CRAVE™ process that combines Cost Risk Assessment (CRA) with Value Engineering (VE) into a single process that can enhance the cost-effectiveness and functionality of the entire program. With CRAVE™, HDR facilitators go beyond traditional problem identification strategies by providing innovative solutions to the toughest challenges—often on an accelerated schedule.

HDR’s CRAVE™ process provides a systematic approach for identifying, assessing, and responding to risks in order to manage or reduce potential adverse effects on the achievement of a project’s goal. Our process to identify, quantify and manage risks is open and transparent and takes place within a consensus-based workshop that involves project team members, key stakeholders and external subject matter experts. It encourages pro-activity and early planning and builds confidence and credibility in a project’s plans and estimates. Through this process, we work to develop targeted mitigation strategies for all anticipated threats. Overall, our process ensures transparency, integrity, and accountability throughout the life-cycle of the project.

This four-step, iterative process, shown in Figure 9, is closely integrated within regular project management and delivery steps.

Figure 9_The CRAVE™ Process



The ultimate outcome of the process is to provide decision support—answering questions such as how much will the project cost, how long will it take, and why—as well as assist in prioritization of project components, financial planning, and risk allocation.

A key work product from the CRAVE™ process is a risk management plan. This plan describes how the team will deal with uncertainty and risks that affect the project goals. Risk management is an ongoing and integral part of project management and is performed throughout the life of the project. To help achieve success with risk management for the project, the risk management plan communicates the processes that address risk assessment and

monitoring and control for all identified risks, whether they are threats or opportunities.

A value-added feature of HDR’s CRAVE™ process is the ability to track project risk items through the entire project life cycle as the risk quantification changes. This gives CDOT a snapshot of the I-70 Mountain Corridor’s risk profile and its effect on cost and schedule at any point in the project delivery time frame. The latest results can be compared with previous results to re-evaluate decisions made, or help forecast the impact of changes made or considered. Figure 10 illustrates the refinement of the risk-based cost estimate through the CRAVE™ process.

HDR has successfully utilized this process to manage numerous

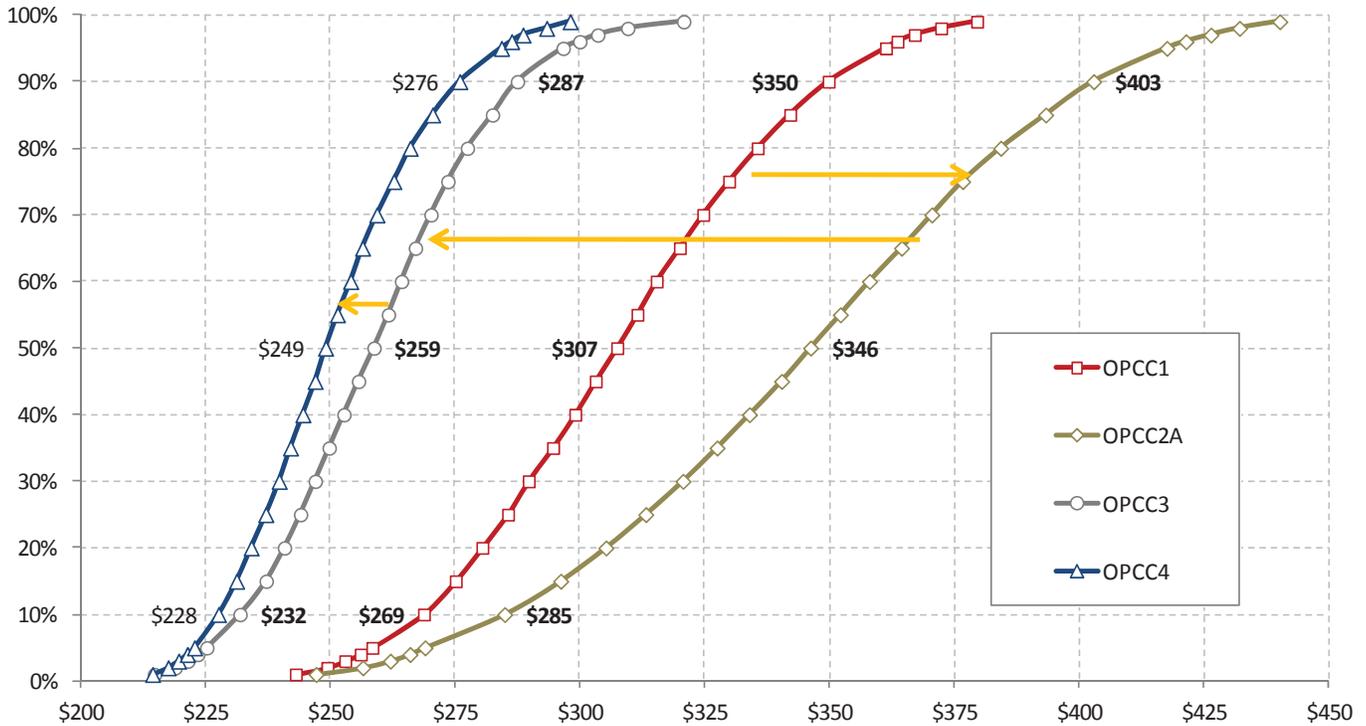


Figure 10 Example of Cost Refinements through CRAVE™ Process

major projects, including tunneling projects such as Washington State DOT’s Alaskan Way Viaduct Replacement Project, the Southern Nevada Water Authority’s Groundwater Project, and a variety of tunnels in New York City DEP’s Dependability program, as well as major transportation programs, such as Washington State DOT’s SR 520 Bridge Replacement Program and Utah DOT’s Mountain View Corridor.

category: Programmatic, Project, and Process.

While this initial register is qualitative in nature, our intent is to provide quantification, in terms of monetary and schedule impacts in future versions. This quantification will take place within consensus-based risk workshops. With the quantified cost and schedule risk factors, risk-based project cost and schedule estimates can be

generated to provide an outlook on the potential range of project costs and schedule outcomes at various points throughout the project delivery lifecycle.

While the initial quantification is based on a scoring index of 1 to 5 for probability and impacts, this can be transitioned to quantitative values based on industry standards. For example, scoring of the Probability, Impacts and the Risk Score could be completed using the following:

Risk Register

As directed in the RFP, we have completed Exhibit C - Risk Register and have included the Exhibit at the end of this section. We modified the Register slightly by including a column to organize the risks by

Score Index	Qualitative Scoring	Probability	Corresponding Cost Impact (as % of project cost)	Corresponding Schedule Impact (as % of schedule length from analysis date)
1	Very Low	Below 10%	Less than 1%	Less than 10%
2	Low	10% to 30%	1% to 2%	10% to 15%
3	Medium	30% to 60%	2% to 5%	15% to 25%
4	High	60% to 80%	5% to 10%	25% to 30%
5	Very High	Above 80%	Greater than 10%	Greater than 30%



The risk register is central to the risk management plan. The risk register on the following page will be the starting point for the identifying, quantifying, developing response strategies, and tracking the management of each risk. This risk register will be updated at each progress review meeting with retirement or downgrading of previously identified risks, identi-

cation of new risks, and proposed redirection when needed. In this manner HDR will be proactive in anticipating and responding to risk-related issues.

Beyond the risk-based cost and schedule estimates, a key output from the CRAVE™ process is the tornado diagram, which is useful for risk prioritization and risk

management. This diagram shows the top risk factors, both threats and opportunities, in terms of their impact on overall project cost or project schedule. Threats are shown as positive values and opportunities as negatives. An example tornado diagram based on the current risk register is provided in Figure 11, which shows the expected value impact of the top cost risks.

Figure 11 Example Tornado Diagram for Top Project Risk Factors

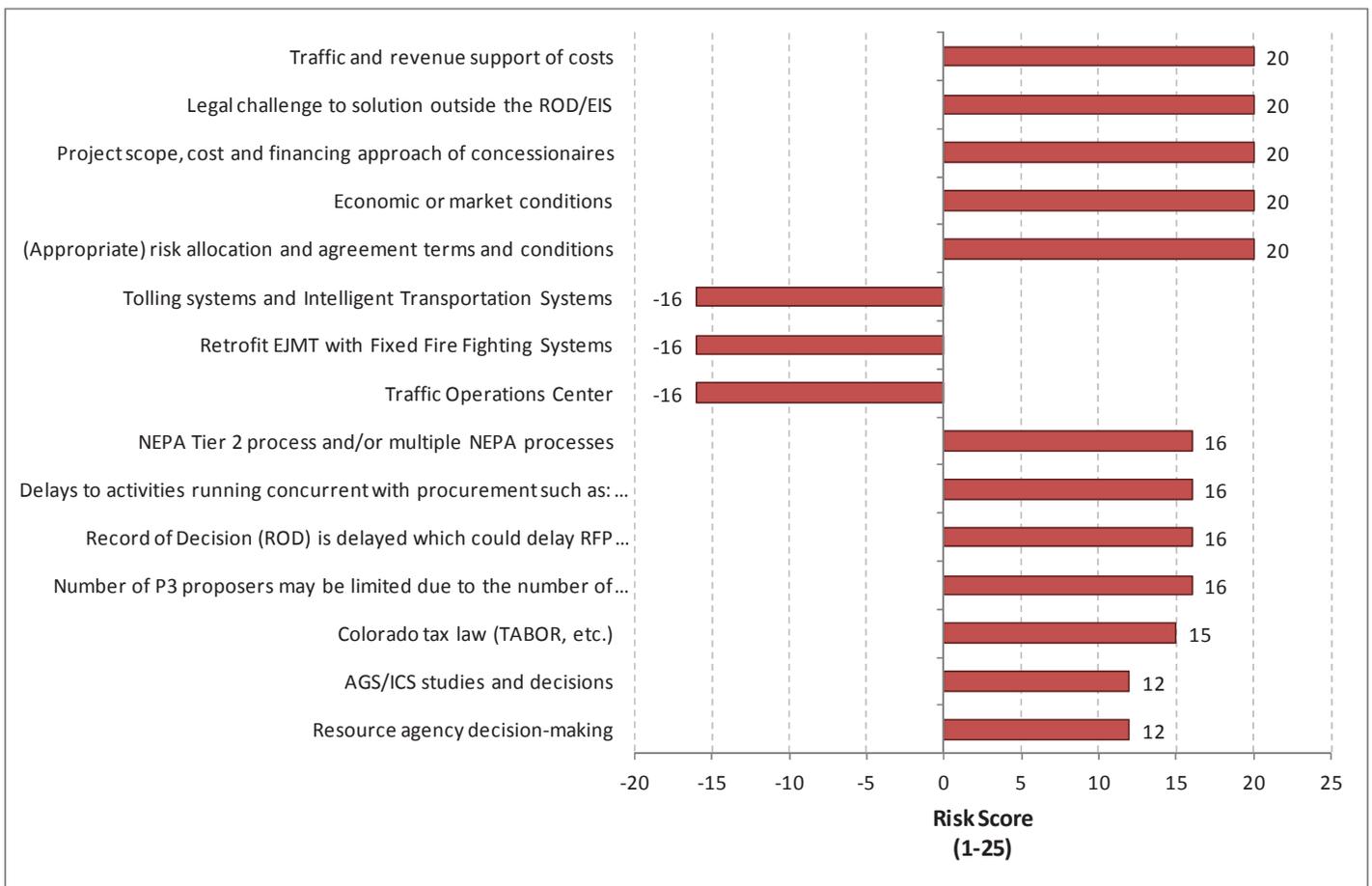


Exhibit C_Sample Risk Register

Risk Category	Risk/ Opportunity	Potential Consequence to the Project	Risk Type (Programmatic, Project, or Process)	Assignment (CDOT, Co-Developer, Concessionaire)	Probability (1-5)	Impact (1-5)	Risk Score (1-25)	Comments/Action to Mitigate/Manage
TECHNICAL	Compliance of safety/design standards	Redesign, out of scope construction, revenue delay	Project	CDOT & Co-Developer	1	2	2	Schedule and conduct design reviews and perform field verification during construction for compliance with all relevant design and safety standards to ensure functionality and maximize safety of workers and road users.
	Tolling systems and ITS	Improved revenue collection and traffic flow	Programmatic	Co-Developer & Concessionaire	4	4	16	Engage team's international expertise to implement and optimize robust state-of-the-art technologies to avoid delays and streamline fee collection.
	Retrofit EJMT with Fixed Fire Fighting Systems	Improved support of trucking industry and safer more efficient transportation of hazardous mat.	Project	Co-Developer & Concessionaire	4	4	16	Build on team's knowledge of FFFS worldwide and advance design of recently completed preliminary engineering of a FFFS for EJMT to improve hazardous cargo mobility while maximizing the safety of workers and road users.
	Enhance Traffic Operations Center	Improved revenue collection and traffic flow	Programmatic	Co-Developer & Concessionaire	4	4	16	Engage team's international expertise to provide real-time information to Corridor users during and post construction.
	Upgrades to "system to system" interchanges	Improved local traffic flow	Project	Co-Developer & Concessionaire	3	3	9	Coordinate with CDOT to evaluate partnering with local jurisdictions to develop concepts for non-gateway interchange upgrades to maximize opportunities to businesses and communities in the Corridor.
	Scope, timing and approval of AGS transit plan	Delay to traffic and revenue analysis, failure to achieve financial close	Programmatic	CDOT	2	4	8	Develop alternative program delivery strategies that allow completion of projects unaffected by the outcome of the AGS study.
	Minimize impacts to existing facilities	Construction delay minimized, redesign during construction	Project	Concessionaire	3	2	6	Schedule and conduct design reviews to confirm all planned improvements, minimize impacts to existing facilities and congestion, and improve mobility in the Corridor. Proactive construction management to minimize inconvenience to the traveling public and Corridor communities and provide access for emergency services.
	Alignment and construction constraints	Additional design cost, does not achieve design speeds, construction delays	Project	Co-Developer & Concessionaire	2	3	6	Schedule and conduct design review to confirm all planned improvements, reduce congestion and optimize mobility in the Corridor. Proactive construction management to minimize inconvenience to the traveling public and Corridor Communities and provide emergency access.
	Differing site or geologic conditions (esp. tunnels)	Construction delays	Project	CDOT & Co-Developer	3	3	9	Implement risk management measures developed for underground construction including phased geotechnical site investigation, Geotechnical Baseline Report, and Dispute Review Board to identify, mitigate, and eliminate construction risks associated with potential differing site conditions. After quantifying, develop plan to assign (or share) the geotechnical risks to the concessionaire.
	Construction phase highway/transit operational requirements	Construction delays	Project	Concessionaire	3	3	9	Schedule and conduct design and constructability review workshops with contractors to confirm no or minimal impacts to highway and transit systems to minimize inconvenience to the traveling public and Corridor communities and provide access for emergency services.
	Long-term highway/transit operational requirements	Increased O&M costs	Project	Concessionaire	2	2	4	Transfer the risk of long-term operational requirements to concessionaires by clearly defining performance requirements and penalties for noncompliance through concessionaire agreements.
	Project interfaces	Contractor conflicts, construction delays	Project	Co-Developer & Concessionaire	2	2	4	Schedule and conduct design and constructability review workshops to develop project limits, interface constraints and timing requirements to minimize inconvenience to the traveling public and Corridor communities, and provide access for emergency services.

Items in Yellow are benefits or opportunities the HDR team brings to the I-70 Mountain Corridor Program.

Exhibit C_Sample Risk Register (continued)

Risk Category	Risk/ Opportunity	Potential Consequence to the Project	Risk Type (Programmatic, Project, or Process)	Assignment (CDOT, Co-Developer, Concessionaire)	Probability (1-5)	Impact (1-5)	Risk Score (1-25)	Comments/Action to Mitigate/Manage
TECHNICAL	MOT during construction	Traffic delays or accidents, delays to construction	Project	Concessionaire	3	2	6	Engage team expertise in construction management and MOT to develop comprehensive performance requirements for the concessionaire(s) to coordinate and minimize inconvenience to the traveling public and Corridor communities and provide access for emergency services
	Availability of materials, labor, industry resources	Increased costs, construction delays	Project	Concessionaire	2	2	4	CO-Developer will proactively track commodity indices and construction statistics during each phase of the program to develop innovative strategies to minimize or eliminate potential impacts associated with procurement.
	Permit requirements during construction	Delay to start of construction	Project	Concessionaire	2	3	6	During planning phase identify permits required for each project and prepare acquisition strategies and timelines for each. Review strategy, timelines, and resources required to obtain permits with concessionaire subsequent to financial close. Closely track permitting progress and develop mitigation measures to address challenges.
	Hazardous materials, storm water runoff, etc.	Construction delays, redesign during construction	Project	Concessionaire	3	3	9	Complete project-specific site investigations to identify and quantify environmental and construction constraints. Schedule and conduct design reviews to confirm all planned improvements and address identified constraints. Proactive construction management to monitor and confirm effectiveness of implemented mitigation measures to avoid construction delays, maximize safety of workers and road users, and protect the environment.
	Scope changes and plan revisions	Increased costs, permit violations and fines, construction delays	Project	Co-Developer & Concessionaire	3	2	6	Schedule and conduct design reviews and perform field verification during construction for conformance with design, safety and performance requirements to prevent scope creep and ensure functionality.
	Utility and railroad coordination	Construction delays	Project	Co-Developer	3	3	9	During planning and preliminary engineering phases, identify railroad interface requirements for each project and execute strategies for coordination through each phase of the program. Review strategies with concessionaire subsequent to financial close. Utilize HDR's in-house exemplary relationships with Class 1 railroads. Closely track and manage railroad coordination to address challenges.
	ROW acquisition requirements	Redesign, construction delays	Project	CDOT	2	3	6	During planning and preliminary engineering phases, identify ROW acquisition requirements for each project and execute strategies. Review strategies with concessionaire subsequent to financial close. Closely track and manage ROW acquisition tasks to address challenges. For example, early identification of ROWs that will require legal proceedings to avoid delays.
	Changing regulations	Design delays, permitting delays. Added mitigation, construction, and operational costs.	Programmatic	CDOT	3	4	12	CDOT and Co-Developer to monitor local, state and federal regulatory agency activities that may impact the program. If potential regulatory changes are identified, develop and execute strategies for CDOT to engage in the regulatory process to represent the interests of the program. Develop alternative project delivery strategies to mitigate potential impacts.
	CDOT/Resource Agencies/ Local balancing and aligning of interests	Delay to permitting process	Programmatic	CDOT & Co-Developer	3	3	9	Co-Developer will work with CDOT to coordinate with all authorities having jurisdiction and implement the CSS process to negotiate MOUs and binding agreements. The starting point for all MOUs and agreements will be consistency with the PA/ROD.

Exhibit C_Sample Risk Register (continued)

Risk Category	Risk/ Opportunity	Potential Consequence to the Project	Risk Type (Programmatic, Project, or Process)	Assignment (CDOT, Co-Developer, Concessionaire)	Probability (1-5)	Impact (1-5)	Risk Score (1-25)	Comments/Action to Mitigate/Manage
FINANCIAL	Availability of financing resources (federal, state, etc.)	Tolls sole source of funding, reduced or delayed Minimum Program	Project	CDOT & Co-Developer	5	2	10	Establish a common understanding of the needs, options, and timing to enable CDOT to transparently evaluate the funding methods and to optimize and leverage all available funding. Co-Developer will investigate and identify sources for state and federal funding. Co-Developer will prepare and execute a strategy to secure state and federal funding.
	Public and local support and authority for tolling; no use of "1041 powers"	Minimum program reduced or delayed	Process	CDOT & Co-Developer	3	4	12	Conduct a broad and diverse public outreach campaign to openly discuss the financial options with all stakeholders. Areas of outreach focus to include, but not be limited to, resorts, residents, recreational travelers, and trucking freight companies. Objective of the process is to build consensus for an equitable financial plan by working directly with the stakeholders. Will utilize the existing CSS process early and continue proactive outreach through the entire program for program and project-specific funding requirements.
	Revenues increased due to latent travel demand as improvements come on line	Program accelerated	Program	Co-Developer & Concessionaire	3	2	6	As improvements are made to the Corridor, latent travel demand could increase the revenue as more transactions could occur as volumes rise.
	Reliability of cost estimates	No concessionaires submit proposals, no-go decision	Project	Co-Developer	2	4	8	Engage team's cost-estimating expertise and resources to prepare and update cost estimates during each phase of the program. This process will include completing estimates using CDOT guidelines and estimating software such as contractor-preferred Heavy Civil, and current publications of labor, equipment, and material costs. This process will be calibrated using actual recent constructed and bid costs for projects similar in scope. Appropriate contingencies will be applied.
	Traffic and revenue support of costs	Program not financially viable, no-go decision	Project	Co-Developer	4	5	20	Co-Developer traffic and revenue forecasting experts will build a detailed financial model and perform multiple analyses to test key variables for sensitivities to changes in assumptions. Output of analyses will include investment grade report of findings to provide an innovative delivery solution with minimal need for financial support from state and federal sources.
	Revenue-risk assignment of travel demand forecast	Conflict between CDOT and Co-Developer	Programmatic	CDOT & Co-Developer	3	3	9	Establish a common understanding of the needs, options, and timing to enable Co-Developer and CDOT to transparently evaluate revenue-risk retention to optimize financial exposure and return.
	Approval of tolling authority	Program cancelled	Programmatic	CDOT	3	5	15	Early activity during planning phase is to meet with CDOT, HPTE, and FHWA to confirm tolling authority and develop NEPA strategy for environmental clearance.
	AGS/ICS studies and decisions	Revisions to traffic and revenue model	Process	CDOT	3	4	12	Develop alternative program delivery strategies that allow completion of projects unaffected by the outcome of the AGS study.
	Trucking/commerce impacts	No acceptance from trucking industry resulting in political implications	Project	CDOT & Co-Developer	3	3	9	Meet with trucking freight company and trade organization representatives to present team's FFFS solution for EJMT to improve hazardous cargo mobility while maximizing the safety of workers and road users and obtain endorsements. Will utilize the existing CSS process early and continue proactive outreach through the entire effort for program and project-specific funding requirements.

Exhibit C_Sample Risk Register (continued)

Risk Category	Risk/ Opportunity	Potential Consequence to the Project	Risk Type (Programmatic, Project, or Process)	Assignment (CDOT, Co-Developer, Concessionaire)	Probability (1-5)	Impact (1-5)	Risk Score (1-25)	Comments/Action to Mitigate/Manage
ENVIRONMENTAL	Co-Developer commitment to CSS approach	Avoid legal challenges	Process	Co-Developer	1	3	3	Co-Developer CSS efforts will be led by environmental planning and outreach experts with years of experience advancing the I-70 Mountain Corridor NEPA process, CSS requirements, and the needs and issues of all stakeholders. Actively engage stakeholders through CSS process to identify financially feasible mitigation measures.
	Adaptive Management	Balance core values through the CSS process, reduces program and project cost and delay	Program and Project	CDOT, Co-Developer, Concessionaire	5	3	15	Proactive and transparent application of the CSS processes will allow for the anticipation and resolution of concerns before they impact schedule.
	NEPA Tier 1 re-opening	Delay, additional cost for NEPA process and mitigation measures	Process	CDOT & Co-Developer	2	5	10	Co-Developer commitment to a plan that is consistent with the PA/ROD as the starting point, eliminating the need to reopen NEPA Tier 1.
	NEPA Tier 2 process and/or multiple NEPA processes	Delay, additional cost for NEPA process and mitigation measures	Process	Co-Developer	3	4	12	Co-Developer NEPA Tier 2 efforts will be led by environmental planning and outreach experts with years of experience advancing the I-70 Mountain Corridor NEPA process, CSS requirements, and the needs and issues of all stakeholders.
	Multi-modal solution, including AGS, does not meet requirements of ROD	Extended NEPA process, additional mitigation measures and financial impacts	Programmatic	CDOT	3	3	9	Develop alternative program delivery strategies that allow completion of projects unaffected by the outcome of the AGS study
	Legal challenge to solution outside the ROD/EIS	Delay for redesign	Process	Co-Developer	3	4	12	Co-Developer commitment to a plan that is consistent with the PA/ROD as the starting point.
	Design consistency with ROD/Tier 2 clearances	Delay for redesign	Project	Co-Developer & Concessionaire	3	3	9	Schedule and conduct design reviews to confirm all planned improvements comply with ROD and NEPA Tier 2 clearances.
	Obtaining necessary approvals/permits	Project delay, additional permitting cost	Project	CDOT & Co-Developer	5	5	25	During planning and preliminary engineering phases, identify permit requirements for each project and execute acquisition strategies. Review strategies with concessionaire subsequent to financial close. Closely track and manage permit acquisitions to address challenges.
	Additional mitigation measures required	Delay and additional construction costs	Project	Concessionaire	3	3	9	Schedule and conduct design reviews to confirm all planned mitigation measures to reduce potential impacts in the Corridor. Proactive construction management to minimize inconvenience to the traveling public and Corridor communities and provide access for emergency services.
	Resource agency decision-making	Delay to NEPA process	Process	CDOT & Co-Developer	4	3	12	Co-Developer will work with CDOT to coordinate with all resource agencies to obtain MOUs and binding agreements. The starting point for all MOUs and agreements will be consistency with the PA/ROD.
Stakeholder engagement process	Delay to NEPA process	Process	Co-Developer	3	3	9	Conduct a broad and diverse public outreach campaign to openly discuss the financial options with all stakeholders. Areas of outreach focus to include, but not be limited to, resorts, residents, recreational travelers, and trucking freight companies. Objective of the process is to build consensus for an equitable financial plan by working directly with the stakeholders. Will utilize the existing CSS process and respond to PLT comments early and continue proactive outreach through the entire program for program and project-specific funding requirements.	

Exhibit C_Sample Risk Register (continued)

Risk Category	Risk/ Opportunity	Potential Consequence to the Project	Risk Type (Programmatic, Project, or Process)	Assignment (CDOT, Co-Developer, Concessionaire)	Probability (1-5)	Impact (1-5)	Risk Score (1-25)	Comments/Action to Mitigate/Manage
PUBLIC INVOLVEMENT	Corridor and wider political support	Delay to CSS process	Programmatic	CDOT & Co-Developer	4	5	20	Conduct a broad outreach campaign with Corridor and wider political agents to openly discuss the financial options. Objective of the process is to build consensus for an equitable plan.
	Public outreach	Delay in CSS process	Process	Co-Developer	2	3	6	Conduct a broad and diverse public outreach campaign to openly discuss the financial options with all stakeholders. Areas of outreach focus to include, but not be limited to, resorts, residents, recreational travelers, and trucking freight companies. Objective of the process is to build consensus for an equitable financial plan by working directly with the stakeholders. Will utilize the existing CSS process and respond to PLT comments early and continue proactive outreach through the entire program for program and project-specific funding requirements.
	Stakeholder consensus and support	Delay in CSS process	Process	CDOT & Co-Developer	3	3	9	Conduct a broad and diverse public outreach campaign to openly discuss the financial options with all stakeholders. Areas of outreach focus to include, but not be limited to, resorts, residents, recreational travelers, and trucking freight companies. objective of the process is to build consensus for an equitable financial plan by working directly with the stakeholders. Will utilize the existing CSS process and respond to PLT comments early and continue proactive outreach through the entire program for program and project-specific funding requirements.
	Aligned and balanced interests between local stakeholders & CDOT	Delay in CSS process	Programmatic	CDOT	3	3	9	Conduct a broad and diverse public outreach campaign to openly discuss the financial options with all stakeholders. Areas of outreach focus to include, but not be limited to, resorts, residents, recreational travelers, and trucking freight companies. objective of the process is to build consensus for an equitable financial plan by working directly with the stakeholders. Will utilize the existing CSS process early and continue proactive outreach through the entire program for program and project-specific funding requirements.
	Local jurisdiction coordination/approval (incl. HB 1041)	Delay in permitting process	Project	CDOT & Co-Developer	3	3	9	Conduct an outreach campaign with local jurisdictions to openly discuss the financial options. Objective of the process is to build consensus for an equitable plan.
P3 INDUSTRY INTEREST	Clear contract documents leading to concurrence with contract provisions	Acceleration of contract closure	Process	CDOT	4	5	20	Allow appropriate reviews of RFP by internal/external owners, and local agencies providing for clear and concise contract documents; 2) develop a schedule for the RFP process; and 3) provide format for P3 team to ask questions about the RFP.
	Appropriate risk allocation and agreement terms and conditions	Reduce project costs	Process	CDOT & Co-Developer	4	5	20	Conduct a risk allocation workshop, utilizing input from the Expression of Interest (RFEI) process, to craft a risk allocation profile to be used during the procurement development. The objective is to assign risk, that will meet the expectation of the industry while still protecting the interest of CDOT.
	Project scope, cost, and financing approach of concessionaires	Fail to attract concessionaires	Process	CDOT & Co-Developer	3	5	15	Conduct a REIF prior to the release of an RFQ. The objective of the RFEI is to establish communication and solicit interest from the contractor community in the procurement and DB of the project using a P3 process. The RFEI will provide prospective proposers with general information and development status, and allow prospective proposers to provide valuable industry input to CDOT in the overall shaping of the procurement and delivery process.

Exhibit C_Sample Risk Register (continued)

Risk Category	Risk/ Opportunity	Potential Consequence to the Project	Risk Type (Programmatic, Project, or Process)	Assignment (CDOT, Co-Developer, Concessionaire)	Probability (1-5)	Impact (1-5)	Risk Score (1-25)	Comments/Action to Mitigate/Manage
P3 INDUSTRY INTEREST	Economic or market conditions	Fail to attract concessionaires	Process	CDOT	3	5	15	Conduct a contract strategy study to assess the initial/early market conditions. The objective is to structure the initial procurement to align with current market conditions, determine the best procurement strategy, and determine which project(s) met the goals and objectives of CDOT while still providing competition within the bidding community.
	Inability to keep all viable shortlisted teams throughout the procurement process may impact competitive bid prices and affordability	Procurement failure/delay	Process	CDOT	2	4	8	Establish a reasonable and business-friendly procurement process and documents; and conduct pre-bid workshops with potential bidders in order to review information and answer questions during the procurement process.
	Proposer's bid is beyond expectation of price, which could delay/extend procurement	Procurement failure/delay	Process	CDOT	3	4	12	Provide a thorough and reliable (high certainty) estimate of costs and construction schedule; and consider, as appropriate, procurement process around a sliding scale of project completion which allows potential proposers to define part of their bid submittal and the final limits based on available funding limitation. Also provide a joint value engineering and industry review to minimize schedule and budgetary impacts.
	Delays to activities running concurrent with procurement, such as: close of financing; receipt of NEPA decision documents; third party injunctions/lawsuits, etc., cause delay in awarding P3B contract, resulting in cost and schedule impacts	Procurement failure/delay	Process	CDOT	4	4	16	1) Include provisions in the P3 procurement documents to allow CDOT to not award a contract; 2) include provisions to extend the date of NTP; and 3) include process for reduced scope of the P3 contract.
	Base Project is delayed, resulting in delay to RFP documents or concessionaire contract.	Procurement failure/delay	Process	CDOT	4	4	16	Initiate Section 129 application as of NTP; coordination closely with CDOT and FHWA to provide justification and feasibility determination of program.
	Number of P3 proposers may be limited due to the number of qualified design firms that have the ability to handle this type and size of project or for conflict of interest	Procurement failure/delay	Process	CDOT	4	4	16	1) Perform early assessment of industry, and outreach program for industry allowing potential proposers a better understanding of what will be expected; 2) provide adequate opportunities through qualification criteria for other design firms nationwide/worldwide to effectively team and qualify for the Project; and 3) prepare stringent request for qualifications from design-build teams.

Exhibit C_Sample Risk Register (continued)

Risk Category	Risk/ Opportunity	Potential Consequence to the Project	Risk Type (Programmatic, Project, or Process)	Assignment (CDOT, Co-Developer, Concessionaire)	Probability (1-5)	Impact (1-5)	Risk Score (1-25)	Comments/Action to Mitigate/Manage
LEGAL	Procurement procedures and contracts	Expedited award of concessionaire contract(s)	Programmatic	CDOT & Co-Developer	2	4	8	Procurement of the concessionaire could be accelerated if economic indicators improve.
	Compliance with FHWA Section 129	Delay of concurrence	Programmatic	CDOT & Co-Developer	2	5	10	Co-developer will work closely with CDOT to coordinate and interpret applications of legislation and potential impacts of HB 1041.
	Colorado tax law (TABOR, etc.)	CDOT may not be allowed to provide any funding to move program forward	Programmatic	CDOT	3	5	15	CDOT will work with FHWA and legal counsel to interpret constraints of legislation.

Scoring Categories:

Probability of occurrence:

1. <1 in 1,000
2. 1 in 1,000 to 1 in 100
3. 1 in 100 to 1 in 10
4. > 1 in 10
5. 1 (or certain to occur)

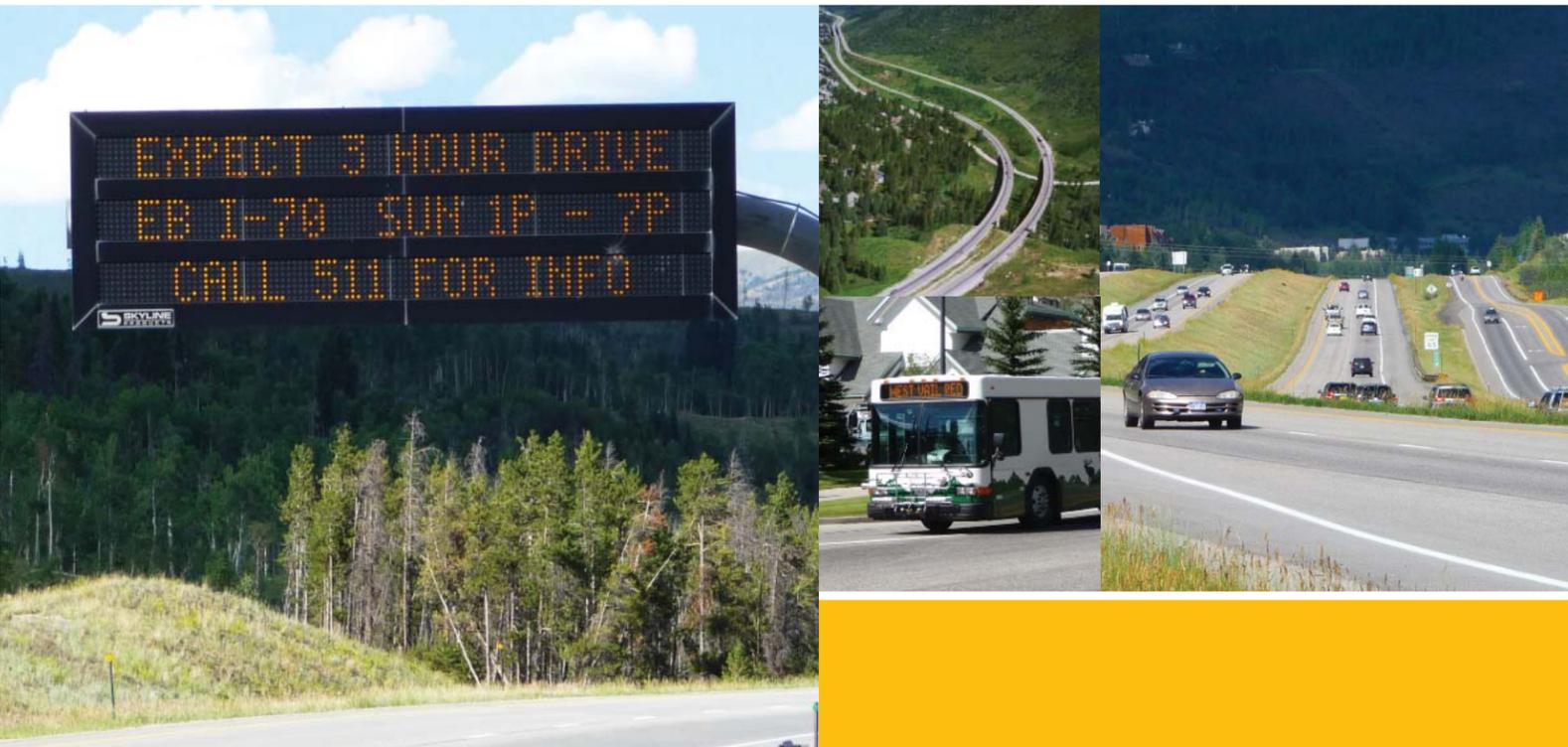
Impact: Consider three types of impacts for major transportation projects and relate that to a program cost: project capital cost, schedule change, and non-economic (safety, environmental, community, owner reputation, etc.). Scoring projects with a price tag of >\$1B, the following scoring is used:

1. Minimal (up to a few \$100K, < 1 month)
2. Minor (up to \$1M, < 3 months)
3. Moderate (\$1-5M, < 6 months)
4. Moderately High (\$5-10M, < 1 year)
5. High (>\$10M, > 1 year)

Risk score: multiply Probability score times Impact score.

6.4

PROJECT FINANCIAL PLAN



6.4_Project Financial Plan

6.4.1_Traffic & Revenue Studies

The HDR team prepared a sketch-level Traffic & Revenue (T&R) analysis of the overall I-70 User-Fee Corridor and the proposed gateway improvements for use in our financial models. As directed in the RFP, this analysis used a 50-year time horizon.

The focus of the sketch-level T&R Study was the mainline improvements and the revenues that could be raised from users benefiting from the mobility improvements. The magnitude of traffic through these gateways and the associated revenues that would be generated is far greater than revenues that would be generated by the access gateways (for example, U.S. 40/Empire, S.H. 9/Silverthorne, etc.). Therefore the traffic, revenue and financial analyses are focused on the primary gateways and the managed lanes on I-70. It is assumed that if

approved by the FHWA as contributing gateways, these access points would generate revenues sufficient to at least rebuild and update each location.

Traffic Characteristics and Historical Trends

The sketch-level T&R assessed the traffic patterns throughout the relevant time periods. Analysis of traffic patterns for the area consisted of reviewing previous studies involving areas of the I-70 Mountain Corridor, as well as current, historical, and forecasted traffic projections from CDOT's traffic database.

Analysis reveals that traffic at the western portion of the corridor has consistent characteristics in terms of traffic volumes by time of day,

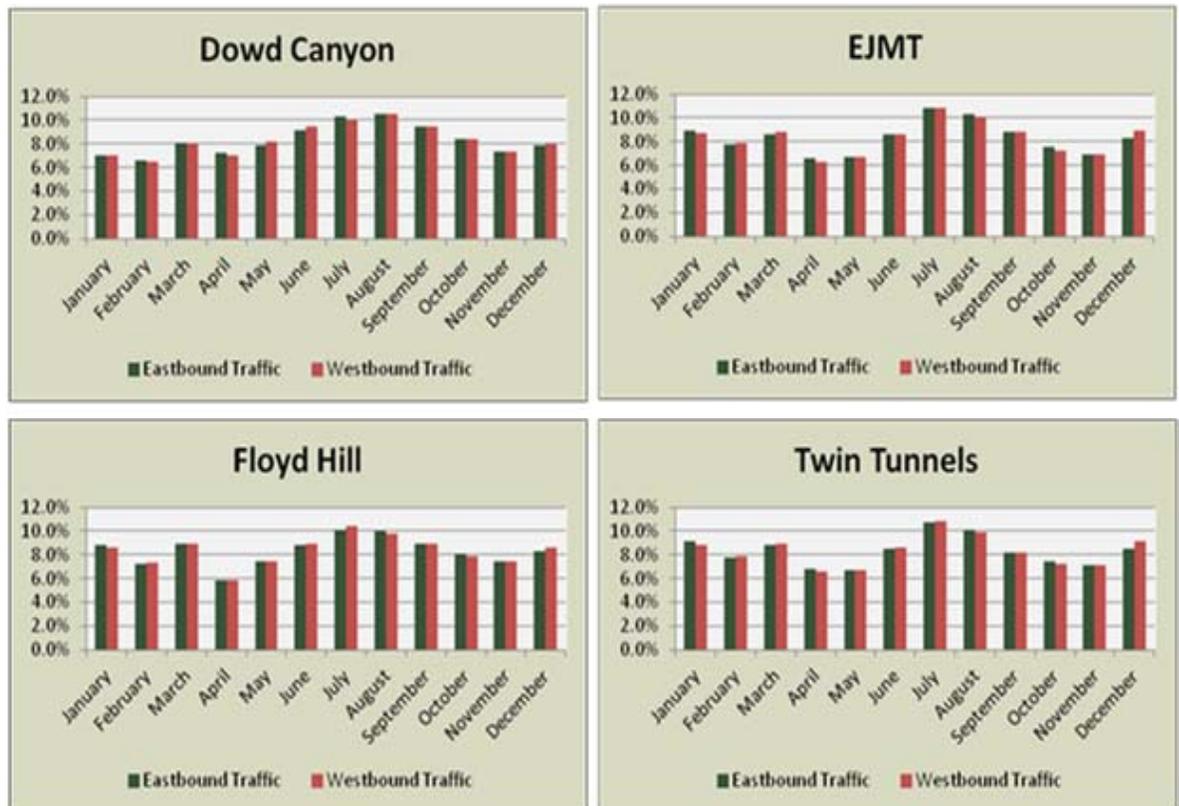
day of week, and month, while locations on the eastern region of the corridor exhibit traffic volumes that vary considerably by time of day, day of week, and month.

Treatment of Seasonal Factors in the Forecast

Seasonal factors were employed based on the historical and current traffic data in the corridor. Figure 12 presents traffic distribution by month for the primary gateway locations in the corridor: Dowd Canyon, EJMT, Twin Tunnels, and Floyd Hill. Traffic patterns on the corridor appear to consist of three separate seasons of activity:

- Winter (December – March)
- Summer (June-August)
- Other (April-May, September-November)

Figure 12_Traffic Distribution by Month

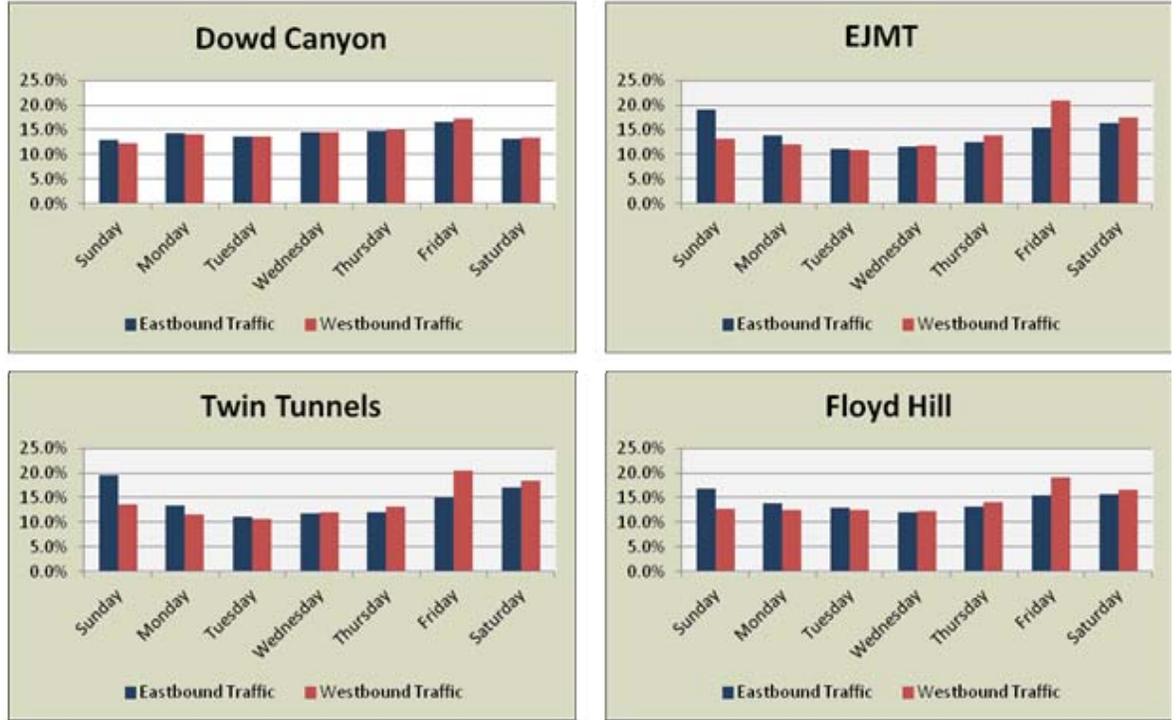


Source: CDOT Traffic Data – 2011; I-70 Mountain PEIS, 2011

Segmentation of Demand

For the purpose of the sketch-level analysis, traffic was segmented by the day of the week and seasonally by month. Days of the week from Thursday through Sunday were considered ‘peak’ days, while Monday through Wednesday were classified as ‘off-peak’ days. While the western segment of the corridor

Figure 13_Traffic Distribution by Day of the Week



Source: CDOT Traffic Data – 2011; HDR

does not experience a pronounced fluctuation in traffic volume by day of week compared to eastern locations, this classification was applied to all tolled gateways. Figure 13 presents the assumed traffic characteristics by day of the week. The analysis segregates by auto and truck. We did not segment users by commuter, recreational, visitor, or local traveler.

Demand Growth Rate

We used a variety of proven sources and assumptions for traffic growth rates throughout the forecast period. A risk-adjusted traffic growth rate by location was developed and calibrated using other forecasted growth rates for the corridor from the PEIS, and socioeconomic growth projections for the Denver MSA and Section 12 data, as well

as Clear Creek, Summit, Eagle and Garfield Counties. Table 9 contains the assumed growth rates used in our study.

As forecasts from different sources varied, a probability distribution was created around the PEIS forecast for growth in the corridor. Table 10 presents the growth rate assumptions that cap out in 2040.

Location	2011 AADT	Average Annual Growth Rates				
		PEIS			CDOT 2011-2037	I-70 EA Briefing 2010-2035
		2010-2020	2020-2030	2030-2040		
DOWD CANYON	31,347	2.9%	2.3%	1.8%	2.4%	
EJMT	29,030	2.6%	2.1%	1.7%	1.9%	
TWIN TUNNEL	42,742	2.5%	2.0%	1.7%	1.9%	1.4%
FLOYD HILL	61,715	2.4%	2.0%	1.6%	1.9%	1.4%

Source: HDR; 2012

Location	Average Annual Compound Growth Rates		
	2010-2020	2020-2030	2030-2040
DOWD CANYON	2.9%	2.3%	1.8%
EJMT	2.6%	2.0%	1.7%
TWIN TUNNEL	2.2%	1.9%	1.7%
FLOYD HILL	2.1%	1.9%	1.6%

Source: HDR; 2012



From 2040 onward, traffic growth was held constant because there is too much uncertainty regarding capacity constraints, travel choices and future construction. Revenues were assumed to grow at a steady-state rate of 0.5%.

Toll Rate Setting

For this sketch-level analysis, we considered the range of possible toll rates to be set as fixed, variable or dynamic toll rates. We also considered the relationship, if any, between the managed lanes and the tunnel/gateway toll rates. For the purposes of the sketch-level analysis, toll rates for the gateway structures vary by day of week to reflect the difference in peak congested traffic conditions versus off-peak flow conditions. The toll rates in the managed lane are determined by the model using a congested level-of-service feedback loop.

The gateway structure toll rate is an assumption, informed by data collected from the FHWA tunnel and bridge toll database for interstate and non-interstate structures. Tolls were assumed to vary by day of week and are shown in Table 11 for the projects in the Core and Option phases of the concession scope of work.

Table 11_Tolling Assumptions for Core and Option Projects	
Day & Vehicle Type	Toll (\$ 2012)
Peak Auto	\$3
Peak Truck	\$4
Off-Peak Auto	\$2
Off-Peak Truck	\$4

Source: HDR; August 2012

For the EJMT, toll rates were assumed to be lower initially with the implementation of the Base Project with initial rates set at \$2 and \$3 for autos and trucks on peak days, and \$1 and \$2 on off-peak days. These tolls then increase in 2016 with the start of the Core project to add the third bore. For our analysis, Thursday through Sunday were considered peak days.

There is no relationship between the gateway toll rates and the managed lanes toll rate. In both cases the assumption is that vehicles with three or more axles (i.e., trucks) will pay a higher toll. This is consistent with the vehicle rates in the FHWA database. For our analysis, all values are expressed in 2012 dollars, so there is no toll growth rate to compare in this sketch-level analysis. Our work in the Level 2 T&R Study will consider changes in toll rates over time.

Description of Sketch Level Modeling Methodology

The final output of the forecasts were created using a simulation technique known as Monte Carlo analysis, that allows each variable and forecasting coefficient to vary simultaneously according to its associated probability distribution.

Gateway Structures

The model begins with 2011 AADT by mainline gateway location and grows traffic over time at the risk adjusted rates mentioned earlier. For this analysis, traffic was grown until 2040. Therefore, we applied a constant growth rate to revenues from 2040 until 2063 to provide the 50-year horizon.

A portion of users are expected to divert their trips due to this toll. A risk-adjusted traffic reduction factor of 10% was used in the estimation. Following review of the studies and documents from the PEIS, we observed that the diversion will most likely be offset by latent demand that will utilize the new “managed” capacity on the highway and line-haul bus service. Table 12 shows when the tolling facilities will come on line.

Table 12_Opening Year Tolling Assumptions		
Gateway	Opening Year	Directional Toll
DOWD CANYON	2017	EB & WB
EJMT	2015	EB & WB
TWIN TUNNEL	2016	EB Only
FLOYD HILL	2016	WB Only

Source: HDR; 2012

Growth rates are for the no-build scenario. Future lane additions or construction which will affect level of service were not included. This simplification required HDR to hold traffic growth constant after 2040, as the forecasts would exceed current capacity constraints. Future revenue was grown at a constant rate of 0.5% from 2040 to 2062.

Managed Lanes

The model employed for the Managed Lane analysis uses a modified version of the “Use of Tools for Rush Hour User Charge Evaluation (TRUCE)” developed for FHWA. For the model, the toll pricing is a function of travel time savings.



The freeway speeds under congestion pricing are largely fixed inputs into the model. The distribution of traffic is based on the current traffic data gathered from the CDOT database. Time savings for the managed lanes are calculated by the model. Savings estimates are presented in Table 13.

Table 13_Mean Expected Time Savings, Minutes per Managed Lane trip (Project #11)

Direction	2020	2030	2040
EB	0.5	1.0	2.3
WB	0.5	0.9	2.1

Source: HDR; July 2012

To be consistent with the ROD, the managed lane will run three miles in the eastbound direction and six miles in the westbound direction both east of EJMT.

Once the third bore of EJMT is constructed and the Managed Lane time savings is combined with the time savings from the reversible lanes (in the Eisenhower Tunnel bore), more than 10 minutes would be saved using both the managed lane and the EJMT. The impact of managed lanes on the general purpose traffic volume, rather than being set uniformly at a 10 percent reduction, depends on the base case distribution of freeway traffic by level of congestion.

Gateways

Potential time savings through peak period bottlenecks were estimated using sketch planning parameters. Flow rates through the reversible segment of EJMT would be managed to provide LOS C linking to the managed (auxiliary) lanes.

Time savings would be in the range of one to three minutes per mile compared to traffic in the more congested general lanes. We will calculate the specific time savings in the Level 2 T&R Study in Phase 1. Tunnel diversion rates are 10.4% for the time period of 2015 to 2020, and 12.4% from 2021 onward.

Truck Percentage Assumptions

We assumed truck traffic represents 10% of total traffic. This is consistent with data from the CDOT database and other corridor studies, where western regions have slightly higher values, and eastern regions have slightly lower values. Table 14 presents select locations on the corridor and their percentage of truck traffic obtained from the CDOT traffic database.

Table 14_Truck Traffic Distribution by Location

Start Point Description	% Trucks
On I-70 E/O SH 6, Gypsum	16.2%
On I-70 NW/O SH 6 AND SH 24, Dowd Junction	9.0%
On I-70 NE/O SH 9, Blue River Pkwy, At Eisenhower Tunnel	10.0%
On I-70 E/O SH 70 BUS RT, Colorado Blvd. at Idaho Springs Twin Tunnels	6.8%
On I-70 E/O Mt. Vernon Country Club Rd, Genesee	5.2%

Source: CDOT databases; 2011-2012

Reduction Factor Assumptions

No ramp-up was assumed other than the difference between the Base project at EJMT and the start of the Core project to complete the third bore.

Transit Considerations

With the addition of new major transit capacity with AGS, transit usage is treated as an exogenous shock to the model beginning in year 2025. In that year with AGS coming on-line, a reduction in traffic on the highway was assumed considering the following:

- PEIS Report findings
- Assumption not all transit ridership is diverted traffic.
- Unmet demand, or potential traffic not currently using I-70 due to congestion, will begin traveling as congestion alleviates.

Until that time, the corridor bus transit system will be in operation, linking with local services in each of the counties. Transit would be incentivized by providing priority through the congested segments via managed lanes (tolled auxiliary lanes or peak period shoulder lanes) and through tolled gateways, primarily the EJMT and Twin Tunnels/Floyd Hill complexes. Transit vehicles would not be required to pay a toll.

Revenue Estimates from Traffic Studies

This section presents a summary of the revenue estimates that result from the traffic model forecasts and analyses.

Gateways

Total revenues by gateway are directly correlated to the number of transactions, due to the assumption of a similar toll rate across all four of the primary mainline locations. This is true with the exception of EJMT, which will have a lower toll rate in its opening year, and then rise to the same level as the tunnel toll rate. Table 15A presents the data.

Annual transactions, shown in Table 15B, will vary by location with the Twin Tunnels EB tolling location collecting the fewest. Dowd Canyon will have the highest number of transactions, as it is assumed to collect tolls in both directions, and has a slightly higher traffic count than EJMT.

Managed Lanes

The revenue from the managed lanes is only generated when peak period congestion exists and the ATM system enables the use of the lanes for a toll. Given the assumptions described previously, the number of transactions and expected revenues are presented in Table 16A and 16B.

6.4.2 Approach to Co-Development Level 2 T&R Study

The Level 2 T&R study is a critical component of the Co-Development Program as it will provide a robust estimate of the revenue potential of the project into the financial

feasibility analysis. The Level 2 study will add greater resolution to the Sketch Level T&R analysis by including more project-specific data and a more-detailed forecasting approach customized to the corridor.

Due to the shared study corridor of the ICS, special coordination must be undertaken between the highway and AGS forecasting. Of benefit to the Level 2 T&R study, the ICS will have collected a wealth of relevant data. Coordination between the ICS ridership and revenue forecasting and the Level 2 T&R forecasting will also be necessary to make sure that the assumptions and inputs of the two studies are consistent, allowing compatible forecasts to be

Table 15A_Mean Expected Annual Revenue for Gateways (50 year period; 2012 dollars – millions)

Gateway	2020	2030	2040	2050	Avg. Annual Compund Growth Rate
DOWD CANYON	\$35.2	\$41.9	\$50.6	\$53.2	1.4%
EJMT	\$40.9	\$45.8	\$54.5	\$57.3	1.9%
TWIN TUNNEL (EB)	\$23.5	\$26.1	\$30.9	\$32.4	2.0%
FLOYD HILL (WB)	\$33.0	\$36.6	\$43.1	\$45.3	3.6%

Source: HDR; 2012

Table 15B_Mean Expected Transactions by Gateway (millions)

Gateway	2020	2030	2040	Avg. Annual Compund Growth Rate
DOWD CANYON	12.8	15.3	18.4	1.8%
EJMT	11.7	13.2	15.7	1.5%
TWIN TUNNEL (EB)	8.4	9.3	11.0	1.4%
FLOYD HILL (WB)	11.8	13.1	15.5	1.4%

Source: HDR; 2012

Table 16A_Mean Expected Annual Revenue for Managed Lanes (50-year period, 2012 dollars – millions)

Direction	2020	2030	2040	2050	Avg. Annual Compund Growth Rate
EB	\$3.7	\$4.2	\$5.1	\$5.4	1.3%
WB	\$3.6	\$4.2	\$5.0	\$5.3	1.3%

Source: HDR; August 2012

Table 16B_Mean Expected Transactions for Managed Lanes (Project #11, daily)

Direction	2020	2030	2040	Avg. Annual Compund Growth Rate
EB	5,018	5,741	6,832	1.6%
WB	4,991	5,708	6,793	1.6%

Source: HDR; August 2012

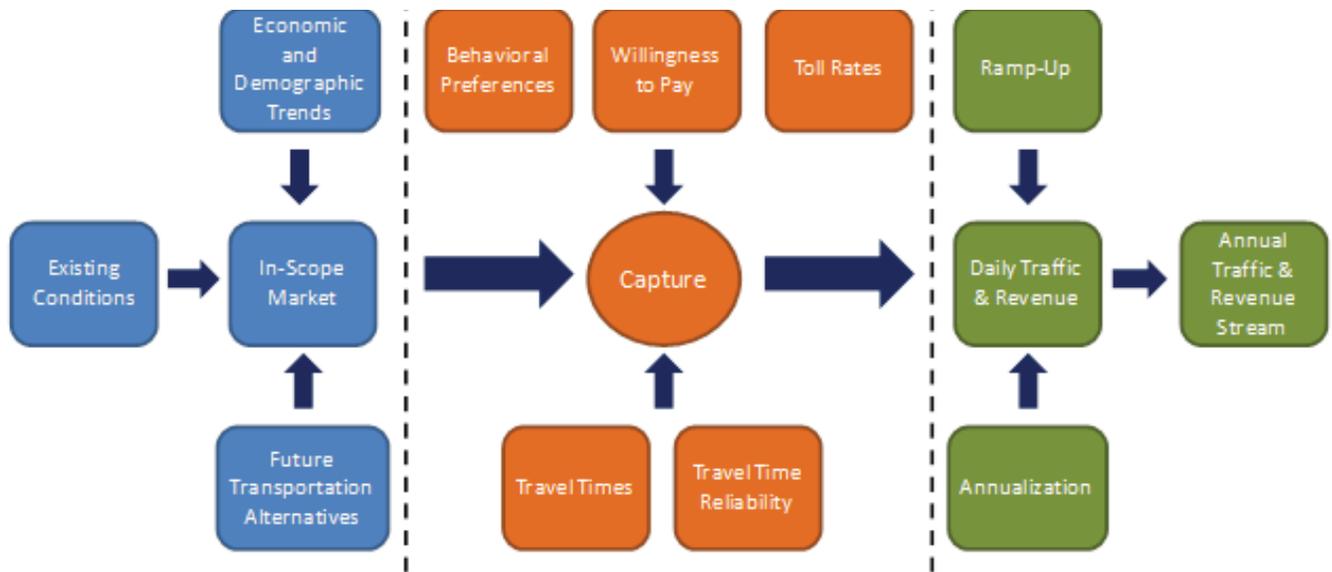


Figure 14_ T&R Forecasting Approach

developed from these studies. At an operational level, things like toll levels, transit fares and rail ticket prices within the corridor need to be viewed in an integrated way because changes in any one of these can directly impact the demand and revenues on the other modes, and these need to be consistently handled between studies.

By the start of the Level 2 study, we will have completed the data collection for the ICS and be able to quickly assimilate this information into the Level 2 forecasting model development. We would also be in a position to ensure the two studies produce consistent forecasts.

Forecasting Approach

The forecasting framework we will employ is depicted in Figure 14. It consists of:

1. Definition of the traffic demand that could use the toll facility - known as the In-Scope Market.
2. Estimation of the proportion of in-scope traffic that will

use the managed lanes - termed Traffic Capture.

3. Conversion of the capture model outputs into annual forecasts, including the use of future year traffic growth forecasts and changes in behavior as external conditions change over time.

We will implement this framework over the four tasks described below.

Task 1: Data Collection

1 The first task of the study will involve data collection. We will undertake this task by building upon the information prepared during the sketch level T&R, and assimilating the data that SDG will have collected for the ICS. While the modeling approach and the data it requires are currently being established for the ICS, this information should be collected by the time the Level 2 data collection effort begins. We envision collecting the following data and information for the study:

- Historical traffic count data
- Air and bus schedules and passenger data
- Relevant transportation planning reports
- Recent corridor travel forecasting studies
- Land use and socioeconomic information
- Travel time information
- Stated preference surveys
- Trip pattern information
- Ski resort visitor surveys

The information collected will be used in the development of the traffic forecasting model.

Task 2: Corridor Growth Analysis

2 In order to appropriately represent future congested conditions, it is important to understand how traffic in the corridor will grow. We will conduct a land use review of the factors likely to drive corridor growth using socioeconomic data from federal, state, regional, and local



sources. The types of socioeconomic information we will collect include population, employment, income levels, CPI and GDP/GSP. For future population and employment forecasts, we will compare the forecasts prepared by regional agencies, the Colorado State Demography Office, and the Office of Economic Development and International Trade with those from independent sources.

We will also pay attention to special generators that impact the study corridor, including area ski resorts and other leisure/tourism attractors. We will review planned expansion.

Based upon this review, we will develop estimates for future growth of corridor traffic. We will investigate the preparation of these estimates through an economic model that will explicitly tie corridor growth to economic growth, fuel prices, tolls and several other factors.

Task 3: Traffic Forecasting Model Development

3 The development of the traffic forecasting model begins with the definition of the market segments we will consider. Based upon the data we collect in Task 1, we will establish these market segments. Our market segmentation will be developed using a combination of attributes presented in Section 6.4.1.

Within the general framework identified above, we will develop a capture model that determines how much traffic of each model segment will use the project. We will establish the components of the model as follows:

- **Demand:** As established in Task 2.
- **Supply:** Existing condition plus the Project and any other new projects contained in transportation plans. The supply fed into the model will also consider the planned level of service for alternate modes, such as air, bus, and potential AGS.
- **Parameters:** Value of time and reliability based upon survey data and regional income levels as identified in Task 1. Where direct survey data is lacking, we will utilize our experiences from similar corridors to establish appropriate values of time for each market segment.
- **Toll rates:** User-defined input to the model.

Task 4: T&R Forecasts

4 We will develop T&R forecasts using direct model outputs to establish an annual stream of T&R by:

- Converting the daily model outputs to an annual level.
- Interpolating and extrapolating between and beyond the model forecast years.
- Applying ramp-up to the initial years.

We will run the No-Build configuration, as well as a limited set of alternate configurations. These alternate configurations will

consider more and less additional capacity, through implementation of managed lanes or exclusion of certain tunnel expansions.

We will also conduct a series of sensitivity tests to ensure that the model is providing sensible results, as well as to evaluate the sensitivity of the forecasts to adjustments of various inputs. While the specific tests will be defined over the course of the project, the tests will likely include:

- Demand adjustments, such as changes to traffic growth.
- Supply adjustments, including changes to competing modes.
- Capture model parameter adjustments, such as adjustments to value of time.

6.4.3_Sketch Feasibility Analysis

This section presents our scoping-level cost estimates compared to our estimated revenues from the sketch-level T&R work.

Toll Collection Costs

Operating costs to record, track and invoice for toll transactions assumed 17 cents per transaction due to toll collection operating costs. This number was reported by the E-470 Authority and is consistent with the price that is charged to CDOT on the North I-25 Express Lanes.

As the team member preparing the ridership and revenue forecasts for the ICS, SDG is uniquely qualified to prepare the Level 2 T&R Studies.



Highway and Tunnel Maintenance Costs

The feasibility analysis included the maintenance costs for the managed lanes shown in Table 17A. The routine maintenance includes crack sealing, signing and striping, guardrail maintenance, trash removal, and snow plowing.

In the case of the tunnels, maintenance costs were used as shown in Table 17B.

These costs were applied on a per-lane mile basis based on the estimated length of each tunnel. The sources for these quantities are from ongoing operations at the EJMT complex.

In addition to these maintenance costs, our analysis included operating costs primarily associated with the maintenance of the toll collection system. In particular, a yearly toll collection maintenance cost of \$150,000 was assumed for every system used in the project.

Potential Ancillary Sources of Revenue

The sketch feasibility analysis did not include additional sources of funding besides the revenue



Heather Catron led an innovative solicitation and contract negotiation process for program management, design, and construction services for a \$1.3B program for ODOT, which decreased plan duration from 10 years to 7 1/2 years and retained more than \$30M in savings.

generated by the tolls. However, there exists the potential for ancillary sources of revenues. Traditional sources that have proved successful in other areas can be explored, including leasing of right-of-way for utilities. Given the areas adjacent to the corridor, other innovative sources of revenue can be assessed.

Our work with local jurisdictions to develop the Initial and Long-Term

Transit Service Plan will address the topic of implementing the Transit Hubs. Funding to implement these facilities could include sources from local improvement districts or from tax increment financing tools available to local governments. Because these potential actions are outside the highway toll and revenue concern, they were not reflected in the highway analyses.

Project Delivery Schedule

Construction of the project will take place between 2012 and 2020, based on the schedule in Figure 8. Toll collection at EJMT would start in 2015, and the managed lanes and increased tolls would start in 2020 to coincide with the completion of both the auxiliary lanes (Project 11) and the Third Bore at EJMT.

Bus/Transit Operating and Maintenance Costs

Bus and transit options were not included as part of the sketch level financial analysis. The main reason for this is that these transit systems are expected to be operated and financed separately from highway improvements. These costs were reported in Section 6.2.1.

Table 17A_Maintenance Costs for Managed Lanes

Cost Category	Amount	Unit	Periodicity
Routine Maintenance	\$22,000	\$/lane-mile	Yearly
Minor Rehabilitation (pavement)	\$21,000	\$/lane-mile	Every 10 Years
Major Rehabilitation (pavement)	\$15,000	\$/lane-mile	Every 20 Years

Table 17B_Maintenance Costs for Tunnels

Cost Category	Amount	Unit	Periodicity
Tunnel O&M Cost	\$380,000	\$/lane-mile	Yearly
Minor Rehabilitation (pavement)	\$21,000	\$/lane-mile	Every 10 Years
Major Rehabilitation (pavement)	\$15,000	\$/lane-mile	Every 20 Years

Financial Results

The analysis focused entirely on using toll revenues and private debt to finance the construction and operation and maintenance of the project. At the same time, a key assumption is that CDOT or, by contract with the concessionaire through HPTE, the operator of the user-fee corridor and toll facilities is eligible to borrow funds at relatively low public-sector interest rates (estimated at a real rate of four percent or a nominal rate approaching six percent). As directed by CDOT, the sketch feasibility analysis did not explicitly breakout the co-development costs or any repayment mechanism to cover for those costs; these computations are presented in Part 2.

The financial analysis was done in constant dollars of 2012, using the T&R results from the sketch level T&R, which were also expressed in constant dollars of 2012. The analysis features the following characteristics:

- Incorporates escalation of construction costs when actual construction occurs after it was scheduled.
- Provides an option to limit borrowing amounts based on next year's toll revenues.
- Allows acceleration of construction schedule using either toll revenues or private loans.
- Financial costs and operation and maintenance costs are not subordinate to any other type of expenditure (including acceleration of construction).

Loan repayment is assumed to occur before acceleration of construction.

- Revenues and expenditures are analyzed on a yearly basis.
- Comparison between risk-adjusted results was performed, based on probabilistic assessment of the T&Rs for the project.

Four different scenarios were considered during the feasibility analysis based on two important assumptions: 1) the ability to accelerate the construction schedule; and 2) the existence of a limit on the amount of yearly borrowing based on the future estimation of toll revenues. The four scenarios are represented in Table 18.

Table 18 Financial Scenarios Analyzed			
		PROJECT ACCELERATION	
		No	Yes
LIMIT ON PRIVATE DEBT	No	Gap Filler	Aggressive
	Yes	Conservative	Constrained Acceleration

Source: HDR; August 2012

For each of these scenarios, a series of performance metrics was calculated. These metrics represent key variables that CDOT may include in the planning process of the corridor and included outputs, such as total revenues and total expenditures generated by the project, total capital cost paid, net revenues generated and rate of return.

In addition, each scenario was estimated under a probabilistic environment, where different probabilities of occurrence were associated to different levels of T&R, resulting in risk-adjusted financial performance metrics.

The analysis shows that the project represents an attractive investment, with median revenues representing more than two times the expenditures associated to the project throughout the entire period of analysis (50 years of operation) and for all scenarios considered.

A summary of the results for each of the scenarios is presented in Table 19, using the median T&R estimates.

Table 19 Summary of Results for Each Scenario Using Median T&R Estimates (2012 dollars – millions)				
Performance Metrics	Conservative (NA, BL)	Gap-Filler (NA, NBL)	Constrained Acceleration	Aggressive (A, NBL)
Total Revenues (2012\$)	\$8,295.10	\$8,295.10	\$8,295.10	\$8,295.10
Total Expenditures (2012\$)	\$4,069.75	\$4,859.82	\$4,071.65	\$5,092.47
Capital Expenditure (2012\$)	\$1,751.60	\$1,526.77	\$1,757.80	\$1,479.61
Net Revenues (2012\$)	\$4,225.35	\$3,435.28	\$4,223.45	\$3,202.63
IRR	6.52%	3.87%	6.52%	3.44%



Furthermore, using the probabilistic approach to estimate the financial performance metrics described above, specific analysis can be performed for specific years under different scenarios. Figures 15 and 16 represent the probabilistic net revenues estimated for each of the four scenarios for year 2030. For each potential amount of net revenue plotted in the X axis, the graph shows the probability that its realized value does not exceed that amount (e.g., there is approximately a 10 percent probability that the net revenues will not exceed 50 million under the aggressive and gap-filler scenarios).

Finally, the financial analysis can be used not only to determine the viability of different ownership schemes for the project (e.g., P3 concession or public-sector user-fee corridor) but to determine the specific characteristics of an arrangement for a P3 concession that allows a reasonable profit margin for the concessionaire and the maximization of benefits for the users.

As can be seen from the preliminary financial results, the project has potential to generate considerable surpluses through its lifecycle that allow flexibility in the implementation of the I-70 Mountain Corridor.



For example, the tolls could be lowered in order to generate larger public benefits, or some of the excess revenues can be used to support the transit options.

Other topics that can be analyzed include the scope of the concession (e.g., cover maintenance costs for other sections of the corridor) and an analysis of the length of the tolling period needed to recover the investment.

A more detailed financial analysis that integrates the revenue and expenditure sides of the project will be performed in the Phase 1 of the Co-Developer work.

6.4.4_Highway Tolling Strategies

The tolling strategies proposed and tested by the HDR team reinforce the establishment of a user-fee corridor. Mobility through the corridor is the primary objective; preference for transit will be provided through gateways and in managed lanes.

By procuring a concessionaire, CDOT will be assigning the risk of raising adequate levels of revenue to the concession. Therefore, a process to levy appropriate and fair tolls will be developed in Phase 1 of our project. An overall tolling policy framework will be developed and agreed to with CDOT and FHWA during the development of the concession procurement. The policy will include a process to control toll rates and changes to be inserted as the central feature to the revenue part of the agreement.



Gary Foyt understands that implementing non-traditional transportation delivery processes and procedures requires flexibility, client understanding, specific solutions, continuous communication, and the ability to incorporate the work of others smoothly.

The process will involve ways to measure performance of revenue generation, and ways to adjust revenue generation within certain ranges established in the agreement.

A major part of our work for TxDOT on the NTE was to develop a tiered revenue generation structure. The objective was to limit the potential for “windfall” profits. The tiered structure provided for incentives for the concessionaire to continue to implement remaining portions of the expressway through a revenue-sharing process.

The design of the gateways was based in part on the ability of corridor users to make trips within segments and not incur

The HDR team risk management approach focuses attention on key areas of risk, to avoid escalation of cost through delays or other impacts as project development proceeds.

Figure 15_Yearly Estimated Revenues and Expenditures, Aggressive Scenario

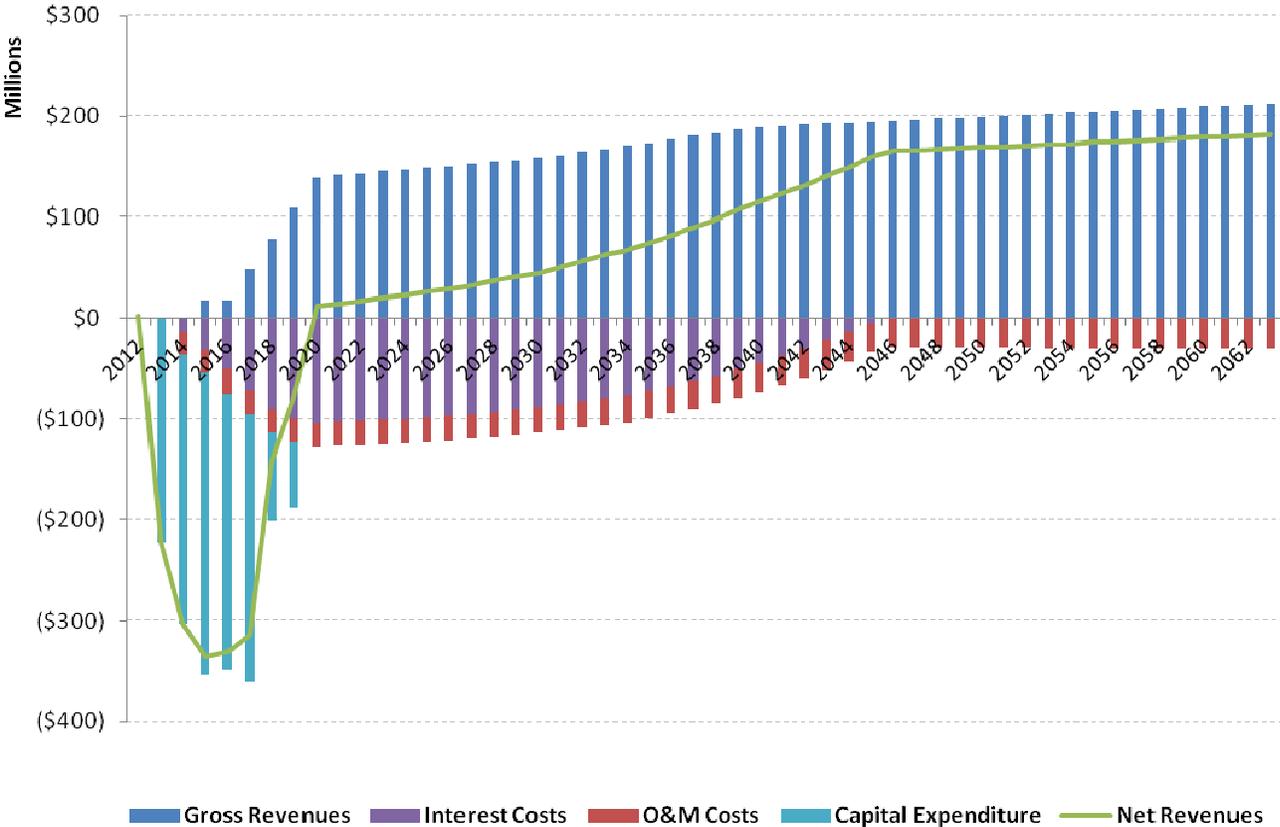
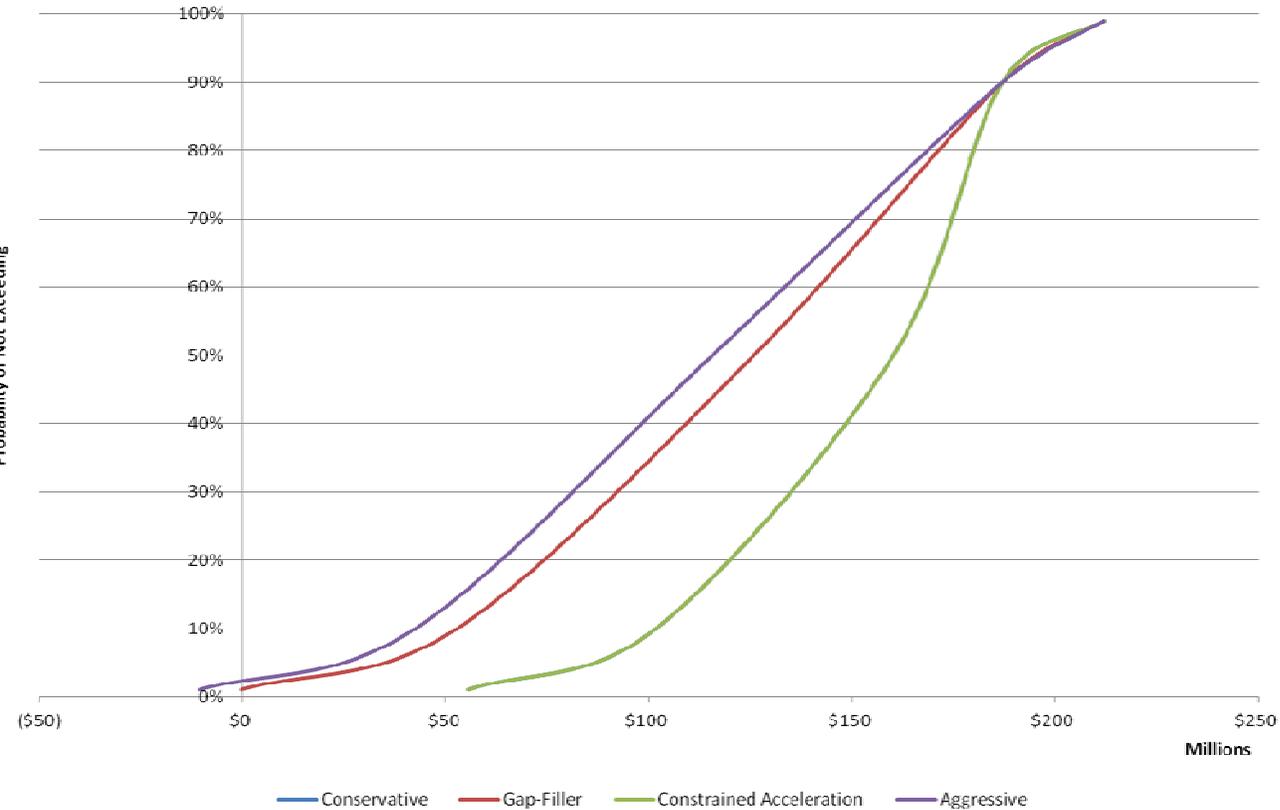


Figure 16 – Probabilistic Assessment of Net Revenues





a toll charge. For example, if a trip begins in Idaho Springs and ends in Georgetown, no gateways are crossed and therefore no toll charges would be incurred. If that same trip continues west through the EJMT, a toll charge would be incurred for all trips.

Depending upon the policy that would be developed in Phase 1, special toll rates could be applied for groups of users within certain areas of the corridor. The HDR team recommends using video technology for license plate recording and user-fee transactions. Transponders would be issued to applicants that provide proof that they meet certain requirements within the policy for reduced tolls. This technology is used in several parts of the country to help distinguish among user groups according to adopted policies.

The results of the sketch T&R study completed by the HDR team did not consider lower rates for groups within the corridor. After analyzing the results it was determined that the amount of revenue that could be generated by one or more of the gateways would have enough latitude to offer different rates for different user groups if used on a limited and verifiable scale.

The toll strategy depends upon the ability to vary rates between peak and non-peak periods. The primary source of congestion is experienced during peak travel days to and from mountain activities during the winter and summer months. Figure 12 previously illustrated the way travel volumes vary over months of

the year. The ability to charge more in peak periods during peak hours will help to manage travel demands and therefore traffic volumes. By charging different rates during peak periods, reliable travel times can be achieved.



Mike Schneider's career has incorporated development of highway and toll road projects, urban and intercity transit and rail, innovative financing programs and P3 for infrastructure development in the U.S. and in many parts of the world.

6.4.5 Options for Private Investment and Debt Sources

The sketch feasibility analysis did not include any potential sources of funding from the local or federal governments. Despite this, the sketch feasibility results show that investing in the project is attractive, yielding median real return rates between 3.5 and 6.5 percent. These rates alone are enough to attract potential private investors in the form of equity or concessionaires.

The level of attractiveness of the project to the private sector can

be significantly increased if public funds can be directed at funding the early stages of the construction. Funds from the Transportation Infrastructure Finance and Innovation Act (TIFIA) and the Projects of National and Regional Significance (PNRS) programs are available on a competitive basis for projects that generate benefits to a large population and that require assistance to become a reality. Funding is available through a competitive process and the awardees can receive assistance in the form of grants, subsidized loans or stand-by lines of credit that reduce the exposure of private investors and allow the formation of public-private partnerships.

Traditional sources of funds include private lenders (commercial debt) whose terms and conditions are linked to the specific borrower and the potential revenues and risks associated to the project. The decision to use this source of funds should be made after the detailed Level 2 T&R Study and financial study are performed in Phase 1 of the Co-Developer program. In particular, the detailed studies must include a thorough assessment of risks and, if possible, the determination of probabilistic results, where each outcome is associated with a probability of occurrence.

6.4.6 Financial Plan Elements

The HDR Co-Developer team will prepare a detailed Financial Plan during Phase 1 of the program. This Plan will incorporate results of the Level 2 T&R Study, refined cost



estimates, revised risk assessments and policy direction from CDOT/HPTE on schedule and implementation. The Financial Plan must list and assess the viability of the different funding options available to the project. In order to do this analysis, several elements must be included:

- Toll revenue projections
- Other funding sources
- Construction costs: a detailed estimation of the cost based on engineering design work.
- Expenditure estimations
- Cash flow projections
- Risk and mitigation strategies

Different funding sources can be combined to create alternative financial scenarios. Each scenario can then be evaluated based on criteria of relevance to CDOT, such as total cost of implementation, time to construction of the improvements and financial requirements from CDOT.

Given the potential interest by the private sector in the project, a thorough analysis of its risks can be the foundation to an assessment of specific P3 arrangements. By identifying those risks that can be better handled by the different parties to a P3, CDOT will be able to outline a private participation arrangement that transfers to the private sector those risks that can be better handled by it, while keeping risks that CDOT is in a better position to mitigate.

6.4.7 Strategy for Procuring P3 Concessionaire

The HDR Project Plan is structured to procure the P3 Concessionaire in 20 months. The concession agreement will require the implementation of Base improvements, Core improvements, and Optional improvements over a 10- to 15-year period. Depending upon the results of ongoing studies, the concession agreement will provide an option to participate in the AGS program as well.



Our approach also provides a backup plan in the event that it is not possible to reach an agreement with a concessionaire.

The alternative plan would establish the user-fee corridor using a more traditional public-sector based approach led by CDOT and the HPTE.

Strategy to Educate and Attract Potential P3 Concessionaires

Concessionaires are concerned first and foremost with the amount of risk they will be required to take on during procurement and then during program execution. We previously described our Risk Management Approach and Risk Register in Section 6.3.4. Addressing risks in the systematic way we propose will help prospective P3 teams to make accurate proposals.

Steps for Phase 3 - Procurement of Concessionaire

The HDR team will complete the process in 20 months from the NTP for the Co-Developer. The six general steps are:

- 1** Procurement process definition and development to provide Best Value:
 - Objectives
 - Schedule
 - Legal requirements
 - Financial requirements
 - CDOT/FHWA review and approvals
 - CSS review and approvals
- 2** Prequalification solicitation
 - Request for Qualifications
 - Shortlist evaluation
- 3** Procurement solicitation
 - Draft Request for Proposals
 - Industry review and comment
 - Revised Final Request for Proposals
- 4** Concession Proposer bid preparation
 - Response to questions and clarifications
 - Revisions to documents and materials
- 5** Proposal evaluation and selection
 - Review and evaluation of proposals
 - Best Value selection and recommendation
- 6** Contract negotiation and close
 - Final terms and conditions
 - Schedule and performance commitments
 - Financial close



Expectations for P3 Concessionaire

As part of the agreement, the concessionaire would be required to provide three up-front payments to CDOT consisting of:

- Program development costs to date that include the costs incurred by the Co-Developer and by CDOT to complete work in Phases 1-3.
- The amounts deferred by HDR as detailed in Part 2.
- Seed funding to begin Project Development work for the Core and the Optional projects that are defined in the concession agreement. Payments would be made for work efforts on a periodic basis in accordance with the agreement.

One of the concerns outlined in Section 6.4.4 was that of windfall profits. The concession agreement would be structured so that windfall profits are shared with CDOT, and that adjustments can be made to the toll rate structure to limit any windfall to a reasonable return.

For example, during our work for the NTE, HDR developed a tiered revenue generation structure. The objective was to limit the potential for windfall profits. The tiered structure provided for incentives for the concessionaire to continue to implement remaining portions of the expressway through a revenue-sharing process. In simple terms, the tiered structure set revenue targets in which the concessionaire and the state shared in revenues above the amount required to satisfy the terms of the agreement. In the

case of the I-70 gateways, revenue amounts will be set according to Section 129 regulations, and excess revenues will be shared in a tiered structure such as the following:

- Revenues in excess of 100% to 110% of base amounts – retained by concessionaire.
- Revenues in excess of 110% to 120% of base amounts – shared 50%/50% by the concessionaire and CDOT/HPTE.
- Revenues in excess of 120% of base amounts – shared 25%/75% by the concessionaire and CDOT/HPTE.

Alternative Plan to Establish User-Fee Corridor

Although the discussion to this point in our proposal has focused on the procurement of a concession contractor, the HDR team would incorporate steps in Phases 1-3 that would allow a more traditional approach to implementation led by CDOT and HPTE. The key decision by CDOT will be the amount of revenue risk that would be assumed by the public sector. A publicly financed program of improvements is possible for the corridor and may offer CDOT more options related to control of the program schedule and decisions concerning management and operations.

In Colorado the issuance of new debt by the state requires a vote of the people to conform to TABOR. Because of this requirement and the need for greater flexibility to implement transportation projects, the HPTE was authorized and established as a separate enterprise. One of the key mechanisms of the

enterprise is that it can issue debt secured against future revenues, such as user fees from the corridor gateways.

HDR will develop a structure for the public sector program that will consider governance as well as project delivery. Currently, jurisdictions along C-470 have been working together to form a joint powers authority to make ongoing policy decisions and to take action to improve the highway including raising funds. Ed Icenogle and Tamara Seaver of ISP are advising the C-470 Coalition. A similar type of “active management” organization could be considered for the I-70 Mountain Corridor. This type of approach may be helpful considering that local jurisdictions along the corridor will exercise HB 1041 approval authority. One means of working with these jurisdictions could be to include them in the corridor management decisions through a governance structure.

We will develop a process to put the questions before CDOT to decide on the appropriate course of action. These decisions will be primarily oriented to the trade-offs between the two approaches. Key considerations include:

- Amount of revenue risk to be assumed.
- Required debt related to schedule of improvements.
- Management control and governance.
- Level of public benefit between the two options:
 - Economic rate of return
 - Ability to leverage other assets



303 E 17th Avenue
Suite 700
Denver, Colorado 80203
(303) 764-1520
www.hdrinc.com