

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT is made and entered this 23rd day of June, 2014, by and between Pueblo, a Municipal Corporation ("Client") and HDR Engineering, Inc. (hereinafter referred to as "Consultant") for Consultant to render professional services for Client with respect to Travel Demand Model, Update (Phase 2) – Project 14-009 and related ancillary services, hereinafter referred to as the "Project." In consideration of the mutual covenants hereinafter set forth, the parties agree as follows:

SECTION 1. GENERAL AND SCOPE OF SERVICES.

(a) Consultant shall satisfactorily perform the professional planning and consulting services for the Project described in more detail in Schedule 1 attached hereto and incorporated herein by reference (the "Basic Services"). Such services shall include all usual and customary professional services including any required drafting or design services incident to its work on the Project. In the event this Agreement follows the selection of Consultant by Client pursuant to a Request for Proposals or RFP, all of the requirements of that Request for Proposal or RFP are incorporated herein by reference, unless any requirement is expressly excluded in Schedule 1.

(b) To the extent Consultant performs any of the Project work through subcontractors or subconsultants, Consultant shall be and remain as fully responsible for the full performance and quality of services performed by such subcontractors or subconsultants as it is for services performed directly by Consultant or Consultant's employees.

(c) To the extent Consultant requires access to private property to perform its services hereunder, Consultant shall be required to make arrangements to obtain such access. However, in the event Client has already secured access for Consultant to any such property through a right of entry agreement, access agreement, letter of consent or other instrument, Consultant shall fully comply with and be subject to the terms and conditions set forth therein. A copy of any such instrument will be provided to Consultant upon request.

SECTION 2. CONSULTANT'S RESPONSIBILITIES.

(a) Consultant shall be responsible for the professional quality, technical accuracy and timely completion of Consultant's work, including that performed by Consultant's subconsultants and subcontractors, and including drawings, reports and other services, irrespective of Client's approval of or acquiescence in same.

(b) Consultant shall be responsible, in accordance with applicable law, to Client for all loss or damage to Client caused by Consultant's negligent act or omission.

(c) Consultant shall be completely responsible for the safety of Consultant's employees in the execution of work under this Agreement and shall provide all necessary safety and protective equipment for said employees.

(d) Consultant represents that Schedule 3 attached hereto is the schedule by which Consultant proposes to accomplish its work, with time periods for which it will commence and complete each major work item. Except to the extent the parties agree to time extensions or delays beyond the control of Consultant, Consultant shall adhere to this schedule and perform its work in a timely manner so as not to delay Client's timetable for achievement of interim tasks and final completion of Project work.. Consultant further acknowledges that its schedule has accounted for all reasonably anticipated delays, including those inherent in the availability of tools, supplies, labor and utilities required for the work, the availability of information which must be obtained from any third parties, and all conditions to access to public and private facilities.

(e) Before undertaking any work or incurring any expense which Consultant considers beyond or in addition to the Scope of Work described in Schedule 1 or otherwise contemplated by the terms of this Agreement, Consultant shall advise Client in writing that (i) Consultant considers the work beyond the scope of this Agreement, (ii) the reasons that Consultant believes the out of scope or additional work should be performed, and (iii) a reasonable estimate of the cost of such work. Consultant shall not proceed with any out of scope or additional work until authorized in writing by Client. The compensation for such authorized work shall be negotiated, but in the event the parties fail to negotiate or are unable to agree as to compensation, then Consultant shall be compensated for its direct costs and professional time at the rates set forth in Schedule 2 attached hereto.

SECTION 3. FEES FOR SERVICES; PAYMENT.

(a) Client will pay to Consultant as full compensation for all services required to be performed by Consultant under this Agreement, except for services for additional work or work beyond the scope of this Agreement, the maximum sum of U.S. \$149,342, computed as set forth in Schedule 2.

(b) Consultant shall submit periodic, but not more frequently than monthly, applications for payment, aggregating to not more than the maximum amount set forth above, for actual professional services rendered and for reimbursable expenses incurred. Applications for payment shall be submitted based upon the hourly rates and expense reimbursement provisions set forth in Schedule 2 attached hereto, and shall contain appropriate documentation that such services have been performed and such expenses incurred. Thereafter, Client shall pay Consultant for the amount of the application within 45 days of the date such application is received.

(c) No separate or additional payment shall be made for profit, overhead, local telephone expenses, lodging, routine photocopying, computer time, secretarial or clerical time or similar expenses unless otherwise provided and listed in Schedule 2.

(d) No compensation shall be paid to Consultant for services required and expenditures incurred in correcting Consultant's mistakes or negligence.

(e) Compensation for authorized work beyond the scope of this Agreement shall be governed by the provisions of Section 2(e).

(f) In the event services under this Agreement are phased and to be performed in more than one fiscal year or are subject to annual appropriation, Consultant acknowledges that funds only in the amount of initial appropriation are available and it shall confirm availability of funds before proceeding with work exceeding initial and subsequent annual appropriations.

SECTION 4. CLIENT'S RESPONSIBILITIES.

(a) Client agrees to advise Consultant regarding Client's Project requirements and to provide all relevant information, surveys, data and previous reports accessible to Client which Consultant may reasonably require.

(b) Client shall designate a Project Representative to whom all communications from Consultant shall be directed and who shall have limited administrative authority on behalf of Client to receive and transmit information and make decisions with respect to the Project. Said representative shall not, however, have authority to bind Client as to matters of governmental policy or fiscal policy, nor to contract for additions or obligations exceeding a value which is the lesser of \$5000 or 5% of the maximum contract price.

(c) Client shall examine all documents presented by Consultant, and render decisions pertaining thereto within a reasonable time. The Client's approval of any drawings, specifications, reports, documents or other materials or product furnished hereunder shall not in any way relieve Consultant of responsibility for the professional adequacy of its work.

(d) Client shall perform its obligations and render decisions within a reasonable time under the circumstances presented. Based upon the nature of Client and its requirements, a period of 14 days shall be presumed reasonable for any decision not involving policy decision or significant financial impact, when all information reasonably necessary for Client to responsibly render a decision has been furnished. A period of 46 days shall be presumed reasonable for Client to act with respect to any matter involving policy or significant financial impact. The above periods of presumed reasonableness shall be extended where information reasonably required is not within the custody or control of Client but must be procured from others.

SECTION 5. TERMINATION.

(a) Client reserves the right to terminate this Agreement and Consultant's performance hereunder, at any time upon written notice, either for cause or for convenience. Upon such termination, Consultant and its subcontractors shall cease all work and stop incurring expenses, and shall promptly deliver to Client all data, drawings, specifications, reports, plans, calculations, summaries and all other information, documents, work product and materials as Consultant may have accumulated in performing this Agreement, together with all finished work and work in progress.

(b) Upon termination of this Agreement for events or reasons not the fault of Consultant, Consultant shall be paid at the rates specified in Schedule 2 for all services rendered and reasonable costs incurred to date of termination; together with any reasonable costs incurred within 10 days of termination provided such latter costs could not be avoided or were incurred in mitigating loss or expenses to Consultant or Client. In no event shall payment to Consultant upon termination exceed the maximum compensation provided for complete performance in Section 3(a).

(c) In the event termination of this Agreement or Consultant's services is for breach of this Agreement by Consultant, or for other fault of Consultant including but not limited to any failure to timely proceed with work, or to pay its employees and consultants, or to perform work according to the highest professional standards, or to perform work in a manner deemed satisfactory by Client's Project Representative, then in that event, Consultant's entire right to compensation shall be limited to the lesser of (a) the reasonable value of completed work to Client or (b) payment at the rates specified in Schedule 2 for services satisfactorily performed and reimbursable expenses reasonably incurred, prior to date of termination.

(d) Consultant's professional responsibility for its completed work and services shall survive any termination.

SECTION 6. SITE ACCESS.

In the event the Project will require access to property not under the control of Client, Consultant and Consultant's employees and consultants shall obtain all additional necessary approval and clearances required for access to such property. Client shall assist Consultant in obtaining access to such property at reasonable times but makes no warranty or representation whatsoever regarding access to such property. Notwithstanding the foregoing, Consultant understands and agrees that entry to some property by Consultant may be subject to compliance by Consultant with the terms and conditions of an access agreement in accordance with section 1(c) of this Agreement.

SECTION 7. USE OF DOCUMENTS.

(a) Upon payment of all amounts rightfully owed by Client to Consultant for services rendered pursuant to this Agreement, plans, drawings, designs, specifications, reports and all other documents prepared or provided by Consultant hereunder shall become the sole property of Client, subject to applicable federal grant requirements, and Client shall be vested with all rights therein of whatever kind and however created, whether by common law, statute or equity. Client shall have access at all reasonable times to inspect and make copies of all notes, designs, drawings, specifications, and all other technical data or other documents pertaining to the work to be performed under this

Agreement. In no event shall Consultant publish work product developed pursuant to this Agreement except (i) with advance written consent of Client, which consent may be granted or withheld in Client's sole and absolute discretion and (ii) in full compliance with the requirements of this Agreement and applicable federal regulations.

SECTION 8. INSURANCE AND INDEMNITY.

(a) Consultant agrees that it shall procure and will maintain during the term of this Agreement, such insurance as will protect it from claims under workers' compensation acts, claims for damages because of personal injury including bodily injury, sickness or disease or death of any of its employees or of any person other than its employees, and from claims or damages because of injury to or destruction of property including loss of use resulting therefrom; and such insurance will provide for coverage in such amounts as set forth in subparagraph (b).

(b) The minimum insurance coverage which Consultant shall obtain and keep in force is as follows:

(i) Workers' Compensation Insurance complying with statutory requirements in Colorado and in any other state or states where the work is performed. The Workers' Compensation Insurance policy shall contain an endorsement waiving subrogation against the Client.

(ii) Commercial General Liability Insurance issued to and covering the liability of Consultant with respect to all work performed by Consultant and its subcontractors and subconsultants under this Agreement, to be written on a Commercial General Liability policy form CG 00 01, with coverage limits of not less than Six Hundred Thousand and NO/100 Dollars (\$600,000.00) per person and occurrence for personal injury, including but not limited to death and bodily injury, and Six Hundred Thousand and No/100 Dollars (\$600,000.00) per occurrence for property damage. This CGL policy shall be endorsed naming the Client, its officers, agents and employees as additional insureds. This CGL policy shall also provide coverage for contractual liability assumed Consultant under the provisions of this Agreement.

(iii) Professional Liability Insurance with coverage of not less than \$1,000,000.

(iv) Comprehensive Automobile Liability Insurance effective during the period of the Agreement, and for such additional time as work on the Project is being performed written with limits of liability for injury to one person in any single occurrence of not less than \$150,000 and for an injury to two or more persons in any single occurrence of not less than \$600,000. This insurance shall include uninsured/underinsured motorist coverage and shall protect the Consultant from any and all claims arising from the use both on and off the Project site of motor vehicles, including any automobiles, trucks, tractors, backhoes and similar equipment whether owned, leased, hired or used by Consultant.

(c) Consultant agrees to hold harmless, defend and indemnify Client from and against any liability to third parties, to the extent caused by the negligent acts or omissions of Consultant, its employees, subcontractors and consultants.

SECTION 9. SUBCONTRACTS.

(a) Client acknowledges that Consultant is the prime contractor and the only party with whom Client has a contractual relationship under this Agreement. To the extent Consultant performs any Project activities through subconsultants or subcontractors, Consultant shall contractually bind each of its subconsultants and subcontractors by subcontract agreement to all of the terms of this Agreement which are for the benefit of Client, and Client shall be a third party beneficiary of those subcontract provisions.

(b) Consultant shall indemnify and defend Client from all claims and demands for payment for services provided by subcontractors of Consultant.

(c) Consultant acknowledges that, due to the nature of the services to be provided under this Agreement, the Client has a substantial interest in the personnel and consultants to whom Consultant assigns principal responsibility for services performed under this Agreement. Consequently, Consultant represents that it has

selected and intends to employ or assign the key personnel and consultants identified in its proposal submitted to Client prior to execution of this Agreement to induce Client to enter this Agreement. Consultant shall not change such consultants or key personnel except after giving notice of a proposed change to Client and receiving Client's consent thereto. Consultant shall not assign or reassign Project work to any person to whom Client has reasonable objection.

SECTION 10. REQUIRED FEDERAL PROVISIONS.

(a) Consultant understands that Client may be funding the Project in whole or part with funds provided under USC 23 CFR Part 450, Subpart C – Metropolitan Transportation Planning and Programming. Consultant agrees it is subject to and shall comply with all applicable provisions of said USC 23 CFR Part 450, Subpart C, the Act under which the contract award was made, and applicable regulations.

(b) Consultant shall comply with all applicable Federal, State, and local laws applicable to its activities.

(c) All records with respect to any matters covered by this Agreement shall be available for inspection by Client, PACOG Urban Transportation Planning Division at any time during normal business hours and as often as Client, PACOG Urban Transportation Planning Division deems necessary, to audit, examine and make excerpts or transcripts of relevant information, and otherwise to perform its official functions or duties.

SECTION 11. MISCELLANEOUS.

(a) Notices. Any and all notices or other communications required or permitted by this Agreement or by law to be served on or given to either Consultant or Client by the other party shall be in writing and shall be deemed duly served and given when personally delivered to the party to whom it is directed, or in lieu of such personal service, when deposited in the United States mail, first-class postage prepaid, addressed to the Client, Attention:

Scott Hobson, Assistant City Manager for Community Investment, 211 E. D Street, Pueblo, Colorado, 81003, or to Consultant at 2060 Briargate Parkway, Suite 120, Colorado Springs, CO 80920: Attention: Maureen Paz de Araujo. Either party may change his address for the purpose of this paragraph by giving written notice of such change to the other party in the manner provided in this paragraph.

(b) Entire Agreement. This instrument contains the entire agreement between Consultant and Client respecting the Project, and any other written or oral agreement or representation respecting the Project or the duties of either Client or Consultant in relation thereto not expressly set forth in this instrument and its attachments is null and void. In the case of any conflict between the terms of this Agreement for Professional Services and terms of Schedule 1 or any other attachment hereto, the terms of this Agreement shall govern.

(c) Successors and Assigns. This Agreement shall be binding on the parties hereto and on their successors and assigns; provided, however, neither this Agreement, nor any part thereof, nor any moneys due or to become due hereunder to Consultant may be assigned by it without the written consent of Client, which consent may be withheld in Client's sole and absolute discretion. Any assignment or attempted assignment in violation of this subsection shall be void.

(d) Amendments. No amendment to this Agreement shall be made nor be enforceable unless made by written amendment signed by an authorized representative of Consultant and by Client in accordance with the requirements of Section 4(b) of this Agreement or upon authorization of Client's governing board.

(e) Choice of Law. This Agreement shall be governed and interpreted in accordance with the laws of the State of Colorado. Any unresolved dispute arising from or concerning any breach of this Agreement shall be decided in a state court of competent jurisdiction located in Pueblo, Colorado.

(f) Equal Employment Opportunity. In connection with the performance of this Agreement, neither Consultant nor its consultants shall discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, disability or age. Consultant shall endeavor to insure that applicants are

employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, disability or age.

(g) Severability. If any provision of this Agreement, except for Section 2, is determined to be directly contrary to and prohibited by law or the requirements of any federal grant or other Project funding source, then such provision shall be deemed void and the remainder of the Agreement enforced. However, it is the intent of the parties that Section 2 of this Agreement not be severable, and that if any provision of said section be determined to be contrary to law or the terms of any federal grant, then this entire Agreement shall be void.

SECTION 12. STATE-IMPOSED MANDATES PROHIBITING ILLEGAL ALIENS FROM PERFORMING WORK

(a) At or prior to the time for execution of this Agreement (which may be referred to in this section as this "Contract"), Consultant (which may be referred to in this section as "Contractor") shall submit to the Purchasing Agent of City its certification that it does not knowingly employ or contract with an illegal alien who will perform work under this Contract and that the Contractor will participate in either the "E-Verify Program" created in Public Law 208, 104th Congress, as amended and expanded in Public Law 156, 108th Congress, as amended, that is administered by the United States Department of Homeland Security or the "Department Program" established pursuant to §8-17.5-102(5)(c) C.R.S. that is administered by the Colorado Department of Labor and Employment in order to confirm the employment eligibility of all employees who are newly hired for employment to perform work under this Contract.

(b) Contractor shall not:

(I) Knowingly employ or contract with an illegal alien to perform work under this contract;

(II) Enter into a contract with a subconsultant that fails to certify to Contractor that the subconsultant shall not knowingly employ or contract with an illegal alien to perform work under this Contract.

(c) The following state-imposed requirements apply to this contract:

(I) The Contractor shall have confirmed the employment eligibility of all employees who are newly hired for employment to perform work under this Contract through participation in either the E-Verify Program or Department Program.

(II) The Contractor is prohibited from using either the E-Verify Program or Department Program procedures to undertake pre-employment screening of job applicants while this Contract is being performed.

(III) If the Contractor obtains actual knowledge that a subcontractor or subconsultant performing work under this Contract knowingly employs or contracts with an illegal alien, the Contractor shall be required to:

A. Notify the subconsultant and the Client's Purchasing Agent within three (3) days that the Contractor has actual knowledge that the subcontractor/subconsultant is employing or contracting with an illegal alien; and

B. Terminate the subcontract with the subcontractor/subconsultant if within three (3) days of receiving the notice required pursuant to subparagraph (c)(III)A. above the subcontractor/subconsultant does not stop employing or contracting with the illegal alien; except that the Contractor shall not terminate the contract with the subcontractor/subconsultant if, during such three (3) days, the subcontractor/subconsultant provides information to establish that the subcontractor/subconsultant has not knowingly employed or contracted with an illegal alien.

(IV) The Contractor is required to comply with any reasonable request by the Colorado Department of Labor and Employment (hereinafter referred to as "CDLE") made in the course of an investigation that CDLE is undertaking pursuant to its authority under §8-17.5-102(5), C.R.S.

(d) Violation of this Section 12 by the Contractor shall constitute a breach of contract and grounds for termination. In the event of such termination, the Contractor shall be liable for Client's actual and consequential damages.

(e) As used in this Section 12, the terms "subcontractor" and "subconsultant" shall mean any subconsultant or subcontractor of Consultant rendering services within the scope of this Agreement.

SECTION 13. Reserved.

SECTION 14. PERA LIABILITY

Consultant shall reimburse the City for the full amount of any employer contribution required to be paid by the City of Pueblo to the Public Employees' Retirement Association ("PERA") for salary or other compensation paid to a PERA retiree performing contracted services for the City under this Agreement. The Consultant shall fill out the questionnaire attached as Exhibit A and submit the completed form to Client as part of the signed Agreement.

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement as of the day and year first above written.

CITY OF PUEBLO, A MUNICIPAL CORPORATION HDR ENGINEERING, INC. CONSULTANT

By _____
President of the City Council

By: _____

Attest: _____
City Clerk

Name: _____

Title: _____

[S E A L]

BALANCE OF APPROPRIATION EXISTS FOR THIS CONTRACT AND FUNDS ARE AVAILABLE.

Director of Finance

APPROVED AS TO FORM:

City Attorney

Schedule 1 – Scope of Services
PACOG Travel Demand Model Evaluation (Phase 1) and Upgrade (Phase 2); Project Number: 14-009
Contract MOD 1: Phase 2 Services

General

Pueblo Area Council of Governments (PACOG) Metropolitan Planning Organization (MPO) used a phased approach for the Travel Demand Model Evaluation (Phase 1) and Upgrade (Phase 2) project (Project Number: 14-009). PACOG selected and retained HDR Inc. (Contractor) to complete a Phase 1 services that included: 1) evaluation of PACOG’s current and legacy travel demand model versions, and 2) data collection to support travel demand model update and upgrade. PACOG and HDR used a blended team for Phase 1, with the consultant and PACOG staff working collaboratively to accomplish essential project deliverables within an extremely challenging timeframe. The blended team provided additional capacity and will be continued into Phase 2 to support timely model update and alternatives modeling. The blended team vehicle will also support future development of in-house modeling capabilities and will strengthen PACOG staff capacity to continue to maintain and update the model.

Upon completion of the Phase 1 scope of work, PACOG assessed the suitability and capability of the Contractor to complete the full work scope as identified by PACOG within a fixed time of performance required to support completion and adoption of an update to the MPO’s Regional Transportation Plan by January 2015. PACOG confirmed the selection of HDR to continue with the project and perform the following Phase 2 scope of work:

Phase 2 – Task 1: Project Management – Coordination and Meetings

HDR implemented an approach to Project Management for Phase 1 that will be continued into Phase 2. HDR’s approach took basic project management required by PACOG to the next level to support the partnered collaboration needed to meet PACOG deliverable schedule requirements. HDR’s project management approach supports blended team collaboration and PACOG staff capability-building through continuous communication and collaboration framework. Outreach to and coordination with the PACOG Transportation Advisory Committee (TAC) is also being used as a means of extended capability building within the region. HDR will also supplement Task 2.8 model documentation and training efforts to include training of new staff, member government staff and/or consultant training for future updated model project-level applications.

Task 1.1: Project Management Coordination

To facilitate project management coordination, monthly project management meetings and/or conference calls will be convened to support tracking, issues identification and course correction, if needed. These meetings will focus on project schedule, budget and progress tracking and reporting. Meeting participants will include the PACOG management team (Scott Hobson and/or Greg Severance) and HDR Team leads Mary Lupa and Maureen Paz de Araujo.

Task 1.2: Blended Team Collaboration

To facilitate ongoing blended team collaboration, including collaboration among the consultant team, PACOG staff and CDOT, monthly project management activities be supplemented with bi-weekly blended project team progress meetings. Meeting frequency may be increased if warranted, as was done for Phase 1 during which weekly meetings/conference calls were held. These blended team collaboration meetings will stress documenting progress and issues identification and resolution. HDR will schedule and prepare meeting discussion materials and will draft and promptly distribute meeting notes, including documentation of “action items” and responsibilities.

Task 1.3: Informing/Involving PACOG Partners

To facilitate project management on yet a third level, the Consultant will provide up to 3 briefings to the PACOG Transportation Advisory Committee (TAC). The Consultant will practice continuous communication and technical transparency with PACOG and CDOT staff throughout the PACOG TDM evaluation and update project. Briefings to the TAC will be used to leverage existing MPO planning process structure and extend technical transparency to include City and County technical personnel. Involving the full TAC in a limited way will provide a mechanism to supplement local knowledge of the TDM, support plan development, and identify missing or incorrect data and/or sources of required data. We have found that a greater level of acceptance and understanding of the model can also be achieved as a collateral benefit of facilitating limited TAC involvement in the model update process.

We recommend up to 3 TAC project briefings. Key milestones at which briefings could be held included the following:

- Upon Completion of the Travel Model Development Framework and Model Validation
- Upon Completion of Regional Transportation Alternatives Analysis
- Upon Completion of Travel Demand Model Applications

Phase 2 – Task 2: Travel Demand Modeling

The Phase 2, Task 2 scope of work is the heart of the PACOG Travel Demand Model Evaluation (Phase 1) and Upgrade (Phase 2) project. The PACOG has in place a travel model requiring an extensive update. At the same time PACOG must complete and adopt a 2040 Regional Transportation Plan Update by January, 2015. The Task 2 scope of work includes: 1) development and validation of an updated 4-step travel demand model that builds upon PACOG's current legacy TDM; 2) development TAZ-level of 2040 socioeconomic forecasts required as input to the TDM trip generation step; 3) development of an integrated Graphic User Interface (GUI) to support use/application of the PACOG TDM; 4) model-based alternatives analysis; 5) development of selected GUI TDM-based applications to support analysis of model run results, subarea analysis, etc.; and 5) TDM documentation and staff/user training.

Task 2.1: Develop/Validate Base Year Travel Demand Model

This subtask includes a set of tasks required to support delivery of the principal deliverable product required by the PACOG – a fully-functioning, calibrated travel demand model. There are several travel model specific steps along the way. Because this subtask results in staged end products, incremental deliverables are listed at the end of each step discussion. The model development will involve:

- TAZ Layer Review/Construction
- Network Review
- Update of the Trip Generation Model, Classification and Purposes
- Update of the Trip Distribution Model
- Update of the Mode Choice Model
- Development of a Three-Step Commercial Vehicle Model
- Development of an integrated Graphic User Interface (GUI) to support use/application of the PACOG TDM

Mode choice, traffic assignment and sensitivity testing activities are addressed in greater detail below as a part of detailed subtask descriptions:

Task 2.1.1: Network Coding Support

TAZ Layer Review/Construction

The HDR Team will conduct a thoughtful and regionally-based review and enhancement. TAZ construction will conform to the 206 internal zone TAZ boundaries already established by the PACOG for the TDM update. Issues that will be considered include:

- Scale required for the downtown, universities, and externals.
- Accurate capture of recreational land uses. For example, the HDR Team will review all city and state parks, museums, cultural attractions, and casinos, and determine how they may be best captured in the TAZ structure.
- Response to TAZ issues identified by the PACOG during the most recent model application cycle. These issues may include attention to connector links or highway network configurations serving the TAZ layer. Responding to known MPO concerns is the best means of improving the model.

Network Update

Network update naturally follows TAZ update. The HDR Team will to conduct a thorough review of the existing model network coverage as well as node and link attributes. Issues we have identified in other MPOs and other parts of Colorado:

- Is there at minimum a correctly attributed network with number of lanes, functional classification, posted speed and length? Has connectivity been tested?
- Link attribute additions can be important means of enhancing the model and then retaining the results. Examples of useful link attribute activities added and maintained in Colorado Springs are saving the trucks and autos from each time period in an automated link database output, and maintaining an accurate traffic count database within the network with daily trucks by vehicle class, total traffic and the provenance of the count information (year and source).
- Centroid connectors in mountainous areas are a distinct challenge. In areas where a single access roadway is all that is available, the centroid connector should faithfully represent this fact. The HDR Team's work on fire evacuation in Colorado Springs has highlighted the need to look closely at centroid connector placement in MPO models in the mountain states.
- Response to network issues identified by the PACOG during the most recent model application. Responding to the needs identified by the MPO is one of the best means of improving the model.

Task 2.1.2: Base Year Land Use Allocation

The HDR Team will coordinate PACOG staff allocation of base year land use to the final travel demand model traffic analysis zones. Data gathered and analyzed by the blended PACOG/HDR team during Phase 1 (Data Collection/ Model Evaluation) will be used to populate and validate zonal allocations.

Task 2.1.3: Trip Generation

Two trip generation processes are recommended for the PACOG travel model: home-based trip generation and truck trip generation. With direction from the PACOG, our team proposes to conduct a thorough review and enhancement of these processes. For the household trip generation step, we recommend stratification by at least two dimensions - one for household size and one for wealth. The wealth dimension will be household income based. Special generators will also be addressed, including colleges, universities and recreational generators. For truck trip generation enhancements, a three-step commercial vehicle submodel is recommended.

Update Household Trip Generation Cross Classifications

The existing PACOG travel model utilizes a two-way cross-classification trip generation model (household income/household size). Based on the variables included in the socioeconomic forecast, the HDR Team will recommend the stratification scheme. The HDR Team will use 2010 Census data to examine the household distribution patterns by income group, household size and age group and determine the extent to which trip generation categories need to be constructed to best reflect existing household structure and trip rates. Survey information from other regions that have travel characteristics similar to Pueblo will be reviewed for their usefulness.

Update Household Trip Generation Trip Purposes

The inventory activities complete during Phase 1 provide information on the current trip purposes used in the PACOG model. HDR will perform a critical analysis of the trip generation using the 2010 Front Range Household Travel Survey data, accepted national sources, including NCHRP Report 365, and trip rates from other comparable MPOs. During model development in other MPOs, including large urban areas, dense counties, and corridors, our team has found that: (1) detailed land use, particularly in employment categories, can enrich the attraction end of trip generation significantly, (2) External-Internal and External-External (through) trips require special attention in all travel models; and (3) innovative approaches using observed data, are often valuable parallel efforts to traditional trip generation. For example, in DuPage County (IL) which has a strong relationship with Chicago O'Hare Airport, the home zip code of all airport employees was obtained and a work trip approach developed from this data.

Deliverables:

- Update Trip Generation production and attraction rates, approach and results
- Recommendation on approach to each special generator and delivery of working component
- Electronic files of balanced production and attractions at TAZ level for the study years
- Technical documentation of all of the above.

Task 2.1.4: Identify/Integrate Special Generators

Special trip generators will be addressed with guidance from the PACOG to include colleges and universities, key visitor and recreational destinations and other as indicated by the client. During the trip generation development, the HDR Team, in conjunction with PACOG, will determine how these special generators will be treated

College / University Approach

During the conduct of several MPO updates in recent years, capturing college and university trips has been a challenging issue. Because the Phase 1 inventory and discussion has confirmed that benefits can be derived from addressing the Home-University trip purpose, a customized approach will be prepared. In a recent MPO model update, the HDR Team obtained and used the home location of community college students to build trip tables for students who commute to college or trade schools. Where campus housing population totals and the commuter/on-campus percentage of each facility are known, improvements to the Home-University purpose can be made.

Recreational Trip Purpose

Outdoor recreational activities take place year round in the Pueblo area. It is anticipated that a review of the Home-Recreational purpose will show that local, state and national parks attract both local residents and visitors to the region. While a full visitor model is likely beyond the scope of this project, collaborative work by the MPO staff and the HDR Team can identify:

- The recreational locations with the highest visitor counts in the region, and
- The roadways where modeled traffic in the base year are consistently low.

A good example of this process is the integration of the Garden of the Gods (a city park) in Colorado Springs into the MPO model. The park entrance had been consistently under-reported with respect to

traffic. Annual visitor totals were used in the model update to establish targets to this and other parks, boosting the traffic to observed ADT, and improving the usability of the travel model.

Task 2.1.5: Trip Distribution

The HDR Team will evaluate the existing trip distribution parameters used for all trip purposes in the PACOG model. We will examine the coincidence ratio between modeled and other agreed-upon trip length distribution to assist in evaluating the final calibrated trip tables. Others such as district-to-district flows and proportion of intrazonal trips will be examined carefully as well.

Peaking characteristics, directionality and factors used to convert from production-attraction to origin-destination trip tables will be examined using roadway time of day distribution, directional traffic counts, latest Highway Capacity Manual figures, relevant state of Colorado modeling practices, or other local data to ensure that all are applicable to the PACOG travel patterns.

The HDR Team agrees to perform all the following tasks and produce the deliverables listed below:

- A. Review existing trip distribution model parameters with PACOG staff;
- B. Review time of day, vehicle occupancies, trip length distributions using national or latest available PACOG survey results;
- C. Develop and update external-to-external trip tables by trip purposes;
- D. Develop base year production-attraction trip tables by trip purposes;
- E. Convert production-attraction trip tables to origin-destination matrices;
- F. Check reasonableness of the origin-destination trip tables;
- G. Perform necessary iterative parameter adjustments to yield satisfactory validation results.

Deliverables:

- Technical memorandum on trip distribution research and findings with respect to PACOG;
- Statistics, coincidence ratio charts or other graphs showing modeled average trip length, trip length frequency distribution by trip purposes, vehicle type (auto and truck) or by area type
- Maps of base year origin and destination totals by TAZ
- Maps of external-to-external flows through the PACOG study area.

The HDR Team will document the sources of information, impedance measures, assumptions used to develop the impedances, and rationale in performing trip distribution parameter updates in a Technical Memorandum. We will provide the final calibrated trip table statistics, series of maps and desire lines to assist in evaluating the final calibrated trip tables.

Task 2.1.6: Mode Choice Model

The mode choice validation requires that the model assignment be run and feedback / validation performed. For that reason the validation approach is included in this section.

Develop Mode Choice Model

The overall purpose of this task is to review and recommend a mode choice model for the PACOG. This model must be able to replicate observed auto trips by drive alone and shared ride. The mode choice work will be done consistent with the concept of “preserving the envelope” for future development of mode choice. It is anticipated that transit modeling will be addressed in a later update of the model or through the use of a GIS-based tool such as the Federal Transit Authority’s STOPS¹ model. This

¹ <http://www.fta.dot.gov/grants/15682.html>,

resource, if applicable to Pueblo, is a limited implementation of the conventional “4-step” travel model. STOPS replaces the standard model steps with the Census Transportation Planning Package (CTPP) – tabulations from the 2000 Census (and soon, the American Community Survey) to describe overall travel markets. It also replaces the traditional “coded” transit network with standard transit-services data in the General Transit Feed Specification (GTFS) format. More detail is available at the FTA website.

Validate Base Year Mode Choice Results

The travel model outlined and developed in the previous task will be applied within the PACOG overall model structure using TransCAD GISDK code for the chosen base year, likely 2010 or 2012, and the mode choice model will be calibrated by adjusting the modal constants. Once calibrated, it will be validated according to agreed-upon validation goals, using a validation data set developed from the Front Range Survey. In addition to being able to replicate observed traffic, the values of the various model parameters will also be examined and reevaluated as necessary so that they pass a “reasonableness” test based on professional experience and results from similar sized MPOs. It is anticipated that the process of estimation, calibration and validation will require several iterations before a final mode choice model can be accepted.

Deliverables:

- Mode Choice model calibrated with North Front Range survey data sets and validated to observed traffic conditions;
- Technical documentation suitable for model validation and update final report.

Task 2.1.7: Develop a Three-Step Commercial Vehicle (Truck) Model

Depending on the region and the functional classification of the roadway, trucks may be 1-30% of the average annual daily traffic (AADT) on a given roadway, and can have significant impacts on daily and peak hour travel in the region. The HDR Team understands that a working three-step truck model will enhance results in the PACOG model. Resources to be used include recent Colorado DOT or other commodity flow data, the Quick Response Freight Manual², commercial vehicle counts, retail square foot inventory in the Pueblo area, field review of intermodal freight terminals and warehouse sites and military truck/freight movements. The truck submodel will necessarily be integrated with the Internal-External and External-External trip generation step described above. The steps that will be involved in developing the commercial vehicle model are listed below:

- A. Review Existing Truck Model/Collect Data;
- B. Prepare Truck Trip Generation;
- C. Prepare and Test Truck Trip Distribution;
- D. Develop P-A by Truck Type/Size;
- E. Convert P-A to O-D by Truck Type/Size – Integrate E-E and E-I trip generation;
- F. Automate Truck Model with Macro or Program in TransCAD GISDK.

Deliverables:

- Truck trip tables for the all study years;
- GIS files of truck trip generators;
- Technical memorandum of truck submodel.

accessed November 2013.

² Quick Response Freight Manual: 4.0 Incorporating Commercial Vehicles in the Travel Forecasting Process, 1996.

Task 2.1.8: Base Year Model Validation

Validate Base Year Traffic Model

The HDR Team will work with PACOG staff to determine validation standards for daily network assignment results. Example standards could be the maximum allowable deviations from the observed traffic counts. Highway links with the highest volumes are typically expected to have less percent deviation from the observed data than those of lower volume. There are also significant pattern variations across screenlines, by functional classification and by major corridor that are useful avenues of exploration for model validation. Percent Root-Mean-Square Error (% RMSE) between the modeled and observed volumes by functional class and by volume groups is another often used measure to evaluate model overall performance. Other checks, such as a comparison between modeled and actual operating speeds can be used in evaluating the model validity as well.

We will work closely with the PACOG staff to select a set of calibration links whose observed volumes will serve as the target for the validation effort. It is anticipated that the calibration links will be composed of screen lines and critical highway links, with a focus on those roadways that capture major travel movements and help evaluate model accuracy. For example, I-25 or the Arkansas River would make excellent screen lines for the traffic model. Using county boundaries as screen lines would allow the use of the Census data for validating the home based work trip distribution because county-to-county journey-to-work data can be used as a surrogate for the observed work trips.

Based on the PACOG's traffic count databases, the HDR Team, with PACOG staff, will determine if there is sufficient coverage of traffic counts on these screen lines and other critical links and make recommendations if additional counts are needed at these locations. We will perform at minimum daily and peak hour traffic assignments and validate the model based on the established standards mutually agreed upon by our team and the PACOG.

We will review the assignment procedure in place, as well as the volume-delay functions and the capacity table currently employed in the model. Other procedures, such as the multi-class assignment algorithm, pre-load assignment technique will also be investigated so that the distinction in route choices between local and through trips, as well as auto and commercial vehicle trips, can be made.³

The HDR Team agrees to perform all the following tasks and produce the deliverables listed below:

- Perform model calibration runs and make adjustments accordingly; Evaluate traffic loadings and error patterns for those selected screenline locations and critical links identified previously
- Examine operating speeds, volume to capacity (V/C) ratios and network deficiencies with observed information and local knowledge
- Develop standard network and screen line performance reports via software macro

Task 2.1.9: PACOG TDM Graphic User Interface (GUI)

The transportation modeling software of choice at the PACOG is Caliper Corporation's TransCAD. The computer code for this software is known as GISDK. Travel models are typically developed in stand-alone modules within the given software and then assembled into a "Travel Model" – a continuous, linked, repeatable, and stable sequence of the four steps.

Typically the GUI framework is such that scenario addition and refinement can be done programmatically. Streamlined functionality to assist the MPO in planning and modeling will be the focus of the model update work. The HDR Team will build a Graphical User Interface (GUI) is built

³ Model Validation and Reasonableness Checking Manual, Section 7.0 Assignment Procedures, Travel Model Improvement Program, U.U DOT, 1997, <http://tmip.fhwa.dot.gov>.

using the native software, allowing more convenient set-up, review of inputs and outputs, and scenario management.

The HDR Team has built and maintained a knowledge base with respect to TransCAD GISDK. Once the framework of the PACOG model is established, the model steps will be formalized into a GUI and presented to the MPO for review.

Task 2.1.10: Base Year Model Validation Technical Memorandum

We will document in detail the validation process and validation results in a Technical Memorandum and submit it to PACOG for review and approval. Our team will provide model performance statistics and series of maps to assist in evaluating overall model performance.

Deliverables:

- Technical memorandum of overall model performance;
- Final calibration statistics by screenlines or critical links;
- Maps of peak and daily assignment results with subarea maps showing areas of error or concerns;
- Maps of modeled volumes, speeds, and truck percentages;
- Maps of volume/capacity ratios and deficient conditions.

Task 2.2: Future Year Housing and Employment

The PACOG has requested assistance for TAZ level housing and employment data generation for the future years. During Phase 1 inventory activities PACOG decided to primarily utilize in-house staff capability to develop forecasts for future year housing and employment and for the allocation of forecast data to TAZ. PACOG will continue to use the TELUM model for Task 2.4 forecast land use and housing allocations to TAZs. The HDR Team will provide limited assistance for this task as needed. The HDR Team has conducted and led small area forecasting, most recently in Colorado Springs, and we understand that this process is one of the most personal, political and challenging in the travel model development area.

Task 2.3: Future Land Use Allocation

PACOG staff will continue to use the TELUM model for Task 2.4 forecast land use and housing allocations to TAZs. The HDR Team will have a support role for TELUM application including the following roles:

- Preparation of 2000, 2010 and 2040 congested travel time skim matrices from the TDM as input to TELUM runs.
- Development of an interface application to convert TransCAD congested travel time skim matrices as required for input to TELUM.
- Development of an interface application to convert TELUM TAZ-level forecast household and employment data as required for input to TD trip generation.

Task 2.4: Modeling of Alternatives

Design and Test Future Scenarios

The HDR Team will assist the PACOG staff in developing network scenarios for up to four future scenarios: 1) a future no build scenario (2040 spatial allocation of future growth produced by the TELUM modeling process with existing and committed improvements only); 2) future improved scenario with growth allocated in accordance with current trends (2040 spatial allocation of future growth produced by the TELUM modeling process) and additional future improvements; 3) up to two scenarios with alternative future spatial allocations of growth and additional future improvements. Future scenarios can

range from maintenance only, to financially constrained with capacity improvements, to financially unconstrained with capacity improvements (needs based) so that level of service on the highway network associated with each funding and improvements scenario can be evaluated. The Contractor will develop measures of effectiveness, such as vehicle miles traveled (VMT), vehicle hours traveled (VHT), level of service (LOS), operating speed, and others to be used in quantifying operating conditions for each of these future network alternatives.

The Contractor will test proposed network alternatives. Evaluation and analysis will include assessment of coding, model runs for daily and peak hour evaluation, preparation of thematic plots, and conduct of deficiency analysis to assist the development of the PACOG planning effort. Routing changes, and measures of effectiveness (MOE)/performance criteria including LOS, VMT, and VHT, will be compared with those from base year model runs.

Deliverables:

- Technical Memorandum
- Plots of MOE /performance criteria, 2040 peak hour traffic volumes, 2040 Average Daily Traffic (ADT) forecasts for modeled alternatives
- Cumulative MOE/performance criteria results tabulations, including VMT, VMT, etc., for modeled alternatives and baseline alternatives, (e.g. 2010 existing conditions and 2040 Existing + Committed conditions)

As part of scenario development, the Contractor will provide network scenario development rationale, scenario testing procedures, scenario network performance measures as compared to base year traffic condition in a technical memorandum for PACOG review and comments. The Contractor will also provide maps showing traffic volumes, v/c ratios and project operating speeds for each of the network alternatives. Tables summarizing statistics related to the operating conditions or measure of effectiveness as compared to base year condition will be provided as well.

Task 2.5: Development of Application Procedures/Programs

Many of the standard outputs and analysis needs that models are used for can be automated in the GUI environment. These include select link, subarea extraction, volume/capacity ratio, traffic bandwidth plots, and other. The main value of the GUI, however, is to own the capability of setting up, running, retaining and replicating model runs in their entirety for different scenario years. This capability is what the HDR team will build for the PACOG.

This standard functionality of TransCAD GISDK, the GUI, will be customized to the PACOG needs, incorporating all the relevant model inputs and controlling the outputs. The HDR Team understands well this requirement, and how it must allow, first and foremost, the basic model runs required for Air Quality Conformity. The scenario manager can then be expanded to include the desired model components addressed below.

Reporting/Performance Measures Output Procedures

The HDR Team understands well the need for customized reporting to satisfy federal and state requirements for SIP and TIP development, grant application support, and project-level analyses.

We have worked closely with many clients to prepare automated zone, link, and district reporting on Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), congested link plots, select link and desire line graphics and analysis, time of day comparisons and other. We anticipate presenting the “buffet” of available reporting to the PACOG and follow-on enhancement of measures found to be the most valuable to the Pueblo area.

Sub-Area Extraction Procedure

When forecasting transportation demand for a region, the user may want to perform a more detailed investigation of traffic patterns within a subarea, such as the downtown area. To facilitate subarea analysis, TransCAD has a procedure for creating an O-D trip table for that subarea. The reduced O-D matrix may be used as the demand table for performing a traffic assignment on a subarea network, which may be more detailed than the regional network. The subarea matrix and network can also be used as an input to traffic simulation programs such as TransModeler, a TransCAD product.

The HDR Team understands the value of the subarea step. This step can be semi-automated within the TransCAD GUI allowing the PACOG staff to build a customized polygon of influence, run the subarea step and then retain the subarea network and trip tables for further subarea model runs.

Another tool of this type often requested by clients is a select link graphical tool for origin-destination analysis. We recommend building in this tool to the GUI.

Graphical User Interface

As noted above, the Graphical User Interface or GUI must be customized to the agency who will be conducting model runs. There are a small number of key issues that must be addressed as part of the GUI design:

- Ease of use and understanding
- Repeatability
- Automatic scenario construction for ease in cataloguing model runs.
- Compatibility with the TransCAD software version and Build currently in use by the PACOG.
- Desires of PACOG staff.

The HDR Team anticipates at least two sessions during which draft versions of the GUI are field tested and reviewed by PACOG staff then returned to the HDR Team for revision.

All Task 2.7 deliverables will be provided in suitable electronic form. This includes documentation in readable format, TransCAD inputs and computer code and other model data and analyses in formats suitable for use by PACOG staff going forward.

Task 2.6: Present Updated PACOG TDM/Prepare Methodology Report/TDM User Guide

Experience has shown the HDR Team that accurately prepared, completed documentation is critical to retaining the value of a model update after the modeling work is complete. The HDR Team has worked closely with MPOs to develop documentation and training materials (User Manual) that will have lasting value to the model staff within the MPO.

We will prepare technical documentation for each model step in draft format and assemble the components into the final model documentation.

Methodology Report

The HDR Team will prepare a comprehensive technical report detailing the basis, supporting data and analysis associated with each final TDM element. HDR understands the need to document model updates and enhancements. The HDR Team writing leads are also the modeling leads on our team –we will understand the model elements, functionality, and improvements because we will have built them – and we insist upon fine-scaled quality technical reporting.

Important recent samples are the “Pike Peak Area Council of Governments Model Technical Documentation” (Araujo) and the “Indianapolis MPO Mode Split Model Update” (Lupa). These documents and others will provide a frame of reference for the Pueblo TDM documentation. Technical documentation will also include a section on the use and changes to the Caliper TransCAD software

GISDK code. The HDR Team also has a philosophy of building upon all existing reports and technical documentation to maintain efficient library functions for all clients. The HDR Team will provide thorough technical documentation that allows future model developers to understand, replicate, and/or update the travel model approach methodology and results. As appropriate, the documentation will build on existing technical documentation and reports to maintain efficiency for clients.

Additionally, the HDR Team is accomplished at providing “translations” of highly technical materials prepared by the MPO or the consultant team for the general public. A part of this capability is derived from planning and conducting a large number of public meetings and designing the materials that accompany public presentations. Samples are available upon request, focused on MPOs in general, or materials native to Colorado. Chief among the Colorado outreach materials are those related to recreational transportation needs (Boulder), wildfire evacuation (Colorado Springs), and all facets of MPO operations (Colorado Springs).

TDM User Guide/Standards

In addition to the the technical Methodology Report, HDR will prepare a TDM User Guide/Standards Manual. The PACOG Travel Model User Guide will be written with its audience—PACOG staff and local planners and modelers—firmly in mind. The HDR Team recognizes that users need clear instructions and explanations written in accessible language and appropriately illustrated, as well as the need to move beyond the provision of technical documentation to a comprehensive user manual. The writing leads on the team are also the modeling leads on our team – we have worked extensively with user guides as well as training manuals for face-to-face hand-on training sessions.

Model User Training

The HDR Team understands the importance to the PACOG of building in-house capacity to perform model supported MPO planning activities and creating the necessary mechanisms and tools to train future new staff in modeling basics. We have found that MPO staff can learn model application nuances more effectively and will better retain what they learn if they are actively involved in HDR-led model development and testing activities. To that end, we will meet with staff, either one-on-one or via web-supported conference calls, on a bi-weekly basis during model development. This approach will facilitate addressing MPO model functionality priorities and will support data base verification. A collaborative model development approach will also support smooth transition of model control from consultant to staff at the close of the project. To supplement ongoing training, the Contractor will offer a presentation of the final TDM products at the close of the project. The presentation can be limited to staff or extended to include local government or model users if desired. A Training Module deliverable will also be developed to support current and future PACOG staff future use of the updated PACOG TDM. The training module (notebook and supporting example files) will provide a permanent “go to” resource for MPO staff. At MPO discretion, the training module could also be packaged with the deliverable User Guide to support future use of the PACOG model by external users.

SCHEDULE 2 - COST PROPOSAL Project No. 14-009: Travel Demand Model Evaluation (Phase 1) and Upgrade (Phase 2) Contract MOD 1 - Phase 2 Scope of Services		HDR					PB			Project Hours
Budget Labor Tasks & Hours	Senior (HDR)	Senior (HDR)	Intermediate (HDR)	Senior (HDR)	Intermediate (HDR)	Admin (HDR)	Senior (PB)	Intermediate (PB)	Senior (PB)	
	QA/QC Lead	PM & Technical Lead	Technical & GISDK Coding	L RTP Support & Modeling	GIS Lead	Support/Project Control	Travel Model Lead	GIS Lead	Travel Model Specialist	
	Frazier	Paz de Araujo	Petree	Haire	Haugh	Romero	Lupa	Stratton	Eash	
Billable Hourly Rate	\$169.59	\$195.22	\$75.15	\$161.17	\$93.83	\$95.90	\$166.59	\$109.49	\$156.57	
Task 1: Project Management										
Task 1.1 Schedule Control	0	6	0	0	0	0	0	0	0	6
Task 1.2 Budget Control, Tracking and Invoicing	0	6	0	0	0	16	0	0	0	22
Task 1.3 Progress/Management Team Meetings	0	8	0	4	0	0	8	4	0	24
Task 1.4 Participate PACOG TAC Meetings (up to 2)	0	8	0	0	0	0	8	0	0	16
Task 1.5 Prepare Meeting Materials	0	8	0	0	0	0	0	0	0	8
Total Task 1 Project Management	0	36	0	4	0	16	16	4	0	76
Task 2: Travel Demand Modeling										
Task 2.1: Base Year Model (Development/Validation)										
2.1.1 Network Coding Support\QC	0	24	0	24	0	0	0	0	0	48
2.1.2 Land Use Allocation	0	8	0	0	0	0	0	0	0	8
2.1.3 Trip Generation	0	0	0	0	0	0	40	32	0	72
2.1.4 Special Generators	0	0	0	0	0	0	16	8	0	24
2.1.5 Distribution	0	24	0	0	0	0	0	32	0	56
2.1.6 Mode Choice Model	0	0	0	0	0	0	24	32	0	56
2.1.7 Truck Model	0	0	0	0	0	0	16	32	0	48
2.1.8 Base Year Model Validation	1	16	0	0	0	0	16	0	0	33
2.1.9 Build General User Interface (TransCAD GISDK Scenario Manager)	2	24	56	0	0	0	8	0	0	90
2.1.10 Prepare/QC Base Year Model Validation Technical Memorandum	1	24	0	0	0	0	24	0	4	53
Total Task 2.1	4	120	56	24	0	0	144	136	4	488
Task 2.2: Future Year Housing and Employment										
2.2.1 Assist PACOG Staff with Supporting Data Analysis	0	4	0	8	0	0	8	0	0	20
2.2.2 Assist PACOG Staff with Stakeholder Coordination	0	8	0	0	0	0	0	0	0	8
Total Task 2.2	0	12	0	8	0	0	8	0	0	28
Task 2.3: Future Year Land Use Allocation										
2.3.1 Prepare Travel Time Skims for TELUM	0	8	0	8	0	0	0	0	0	16
2.3.2 Assist PACOG Staff with TELUM Application	0	8	0	0	0	0	0	0	0	8
Total Task 2.3	0	16	0	8	0	0	0	0	0	24
Task 2.4: Modeling Alternatives										
2.4.1 Future Year (2040) E+C Coding/Model Run/MOE Results	0	4	0	24	0	0	0	0	0	28
2.4.2 Future Year (2040) Base Growth Scenario Coding/Model Run/MOE Results	0	4	0	24	0	0	0	0	0	28
2.4.3 Future Year (2040) Alternative Growth Scenario A Coding/Model Run/MOE Results (Optional)	0	4	0	24	0	0	0	0	0	28
2.4.3 Future Year (2040) Alternative Growth Scenario B Coding/Model Run/MOE Results (Optional)	0	4	0	24	0	0	0	0	0	28
Total Task 2.4	0	16	0	96	0	0	0	0	0	112
Task 2.5: Development of Application Procedures/Programs (Optional)										
2.5.1 Build Reporting/Performance Measures Output Procedures (TransCAD GISDK)	2	8	32	0	0	0	8	0	0	50
2.5.2 Build Sub-Area Extraction Procedure (TransCAD GISDK)	2	8	32	0	0	0	8	0	0	50
Total Task 2.5	4	16	64	0	0	0	16	0	0	100
Task 2.6: Prepare Methodology Report/TDM User Guide										
2.6.1 Prepare/QC Methodology Report	2	24	0	0	0	0	40	0	0	66
2.6.2 Prepare/QC TDM User Guide	1	24	0	0	0	0	8	0	0	33
2.6.3 Prepare TDM Training Module/Present Updated TDM Training Session	1	8	0	0	0	0	24	0	0	33
Total Task 2.6	4	56	0	0	0	0	72	0	0	132
Phase 2 - Labor Hours	12	272	120	140	0	16	256	140	4	960
Loaded Rate	\$169.59	\$195.22	\$75.15	\$161.17	\$93.83	\$95.90	\$166.59	\$109.49	\$156.57	
Total Direct Labor	\$ 2,035	\$ 53,099	\$ 9,018	\$ 22,564	\$ -	\$ 1,534	\$ 42,648	\$ 15,329	\$ 626	\$ 146,854
Phase 2 - Direct Labor Costs (Billable Hourly Rate x Total Hours)	\$ 2,035	\$ 53,099	\$ 9,018	\$ 22,564	\$ -	\$ 1,534	\$ 42,648	\$ 15,329	\$ 626	\$ 146,854
Phase 2 - Direct Expenses										
									# of Trips	Direct Costs
Travel to Meetings: Hotel (PB)							\$ 84.00		3	\$ 252
Travel to Meetings: Per Diem (PB)							\$ 112.00		3	\$ 336
Travel to Meetings: Autos or Air Costs (PB)							\$ 500.00		3	\$ 1,500
Printing, Plotting (HDR)				\$ 400.00						\$ 400
Local Travel (personal vehicle @ \$0.56/mile)										\$ -
Phase 2 - Direct Expenses				\$ 400.00					\$ 2,088.00	\$ 2,488
Phase 2 - Budget Summary										
Labor Expenses										\$ 146,854
Direct Expenses										\$ 2,488
Phase 2 SOW - Total Cost										\$ 149,342

SCHEDULE 3 - PROJECT SCHEDULE
 Project No. 14-009: Travel Demand Model Evaluation (Phase 1) and Upgrade (Phase 2)
 Contract MOD 1 - Phase 2 Scope of Services

ID	Task Name	Duration	Start	Finish	Predecessors	April 1	May 1	June 1	July 1	August 1	September 1	October 1	November 1	December 1	Ja				
						3/30	4/13	4/27	5/11	5/25	6/8	6/22	7/6	7/20	8/3	8/17	8/31	9/14	9/28
1	Project Management - Coordination and Meetings	148 days	Tue 4/15/14	Fri 11/7/14															
2	0.0 Kickoff Meeting	0 days	Tue 4/15/14	Tue 4/15/14															
3	0.1 Phase 1 & 2 Monthly Schedule Control	105 days	Wed 5/14/14	Wed 10/8/14															
10	0.2 Phase 1 & 2 Monthly Budget Control, Tracking and Invoicing	135 days	Fri 5/2/14	Fri 11/7/14															
18	0.3 Progress/Management Team Meetings	120 days	Wed 4/23/14	Wed 10/8/14															
32	0.4 Phase 2 PACOG TAC Meetings (up to 3)	110 days	Thu 6/5/14	Thu 11/6/14															
33	0.4.1 TAC Meeting - TDM/Land Use (Data Collection/Assumptions)	0 days	Thu 6/5/14	Thu 6/5/14															
34	0.4.2 TAC Meeting - TDM (Model Framework/Validation)	1 day	Thu 8/7/14	Thu 8/7/14															
35	0.4.3 TAC Meeting - TDM (Subarea Model/Applications)	0 days	Thu 11/6/14	Thu 11/6/14															
36	Phase 1: Model Evaluation/Data Collection (Phase 1 SOW)	25 days	Tue 4/15/14	Mon 5/19/14															
37	Task 1.1 Data Collection	15 days	Tue 4/15/14	Mon 5/5/14															
38	1.1.1 Front Range Travel Survey	3 wks	Tue 4/15/14	Mon 5/5/14															
39	1.1.2 Existing Data - Plans, Studies, Land Use, Signage, Parking	3 wks	Tue 4/15/14	Mon 5/5/14															
40	1.1.3 Existing Data - TDM Input Data	3 wks	Tue 4/15/14	Mon 5/5/14															
41	1.1.4 U.S. Census Data	1 wk	Tue 4/15/14	Mon 4/21/14															
42	1.1.5 City/County Records - Building Permits/Utility Records	2 wks	Tue 4/15/14	Mon 4/28/14															
43	1.1.6 Colorado DLA Socioeconomic Data and Forecasts	2 wks	Tue 4/15/14	Mon 4/28/14															
44	1.1.7 Financial Data - Current/Forecast Revenues by Funding Source	3 wks	Tue 4/15/14	Mon 5/5/14															
45	Task 1.2 Model Evaluation	4 wks	Tue 4/15/14	Mon 5/12/14															
46	Task 1.3 Phase 1 Documentation QC	1 wk	Tue 5/13/14	Mon 5/19/14	45														
47	Phase 2: Travel Demand Modeling (Optional Phase 2 SOW)	145 days	Tue 5/20/14	Mon 12/8/14															
48	Task 2.1 Formats/Timelines Scoping Meeting	0 days	Wed 6/11/14	Wed 6/11/14															
49	Task 2.2: Base Year Model (Development/Validation)	55 days	Tue 5/20/14	Mon 8/4/14															
50	2.2.1 Network Coding Support/QC	2 wks	Tue 5/20/14	Mon 6/2/14	46														
51	2.2.2 Land Use Allocation (2010 Base Year)	4 wks	Tue 6/3/14	Mon 6/30/14	50														
52	2.2.3 Trip Generation	2 wks	Tue 6/3/14	Mon 6/16/14	50														
53	2.2.4 Special Generators	1 wk	Tue 6/3/14	Mon 6/9/14	50														
54	2.2.5 Distribution	2 wks	Tue 6/17/14	Mon 6/30/14	52,53														
55	2.2.6 Model Choice Model	2 wks	Tue 7/1/14	Mon 7/14/14	54														
56	2.2.7 Truck Model	4 wks	Tue 6/3/14	Mon 6/30/14	50														
57	2.2.8 Base Year Model Validation	2 wks	Tue 7/15/14	Mon 7/28/14	51,52,53,54,55,56														
58	2.2.9 Prepare/QC Base Year Model Validation Technical Memorandum	1 wk	Tue 7/29/14	Mon 8/4/14	57														
59	Task 2.3 Future Year Housing and Employment	0 days	Mon 6/30/14	Mon 6/30/14	51														
60	Task 2.4: Future Land Use Allocation	5 wks	Tue 7/1/14	Mon 8/4/14	59														
61	Task 2.5: Modeling Alternatives	4 wks	Tue 8/5/14	Mon 9/1/14	60														
62	Task 2.6: Long and Short Range TDM Goals/Objectives	2 wks	Mon 9/8/14	Fri 9/19/14															
63	2.6.1 Develop Model Maintenance and Enhancement Goals and Plan	1 wk	Mon 9/8/14	Fri 9/12/14	61														
64	2.6.2 Prepare Task Technical Memorandum	1 wk	Mon 9/15/14	Fri 9/19/14	63														
65	Task 2.7: Develop Application Procedures/Programs	40 days	Tue 9/2/14	Mon 10/27/14															
66	2.7.1 Reporting/Performance Measures	8 wks	Tue 9/2/14	Mon 10/27/14	61														
67	2.7.2 Subarea Model Extraction	8 wks	Tue 9/2/14	Mon 10/27/14	61														
68	2.7.3 General User Interface	8 wks	Tue 9/2/14	Mon 10/27/14	61														
69	Task 2.8: User Training/Development of Documentation	90 days	Tue 8/5/14	Mon 12/8/14															
70	2.8.1 Prepare/QC Model Development Methodology Report	4 wks	Tue 8/5/14	Mon 9/1/14	58														
71	2.8.2 Prepare/QC Model User Guide/Standards	4 wks	Tue 10/28/14	Mon 11/24/14	66,67,68														
72	2.8.3 Conduct Model User Training	2 wks	Tue 11/25/14	Mon 12/8/14	71														

Project: PACOG Travel Demand Model Evaluation_Upgrade_Revised May 19 2014.mpp Date: 5/29/2014	Task		External Tasks		Manual Task		Finish-only	
	Split		External Milestone		Duration-only		Progress	
	Milestone		Inactive Task		Manual Summary Rollup		Deadline	
	Summary		Inactive Milestone		Manual Summary			
	Project Summary		Inactive Summary		Start-only			

Appendix A

Scope of Service & Fee Schedule

FIRM \ RATE CATEGORY		FULLY BURDENED RATE
HDR	Principal-in-Charge	\$208.00
	Project Manager/Technical Lead	\$195.00
	QA/QC Lead	\$170.00
	Senior Transportation Planner	\$160.00
	Modeler II	\$115.00
	Modeler I	\$75.00
	GIS Analyst	\$95.00
	Project Assistant	\$115.00
	Project Accountant	\$78.00
PLACEWAYS	Professional Rate (All Staff)	\$ 150.00
PB	Technical Lead	\$170.00
	Senior Modeler	\$155.00
	Modeler/GIS Analyst	\$110.00
	Modeler	\$110.00