

**FRESNO COUNCIL OF GOVERNMENTS
AGREEMENT FOR CONTRACTOR SERVICES**

This AGREEMENT, made and entered into this 27th day of January, 2023 (hereinafter "Effective Date") by and between the FRESNO COUNCIL OF GOVERNMENTS, 2035 Tulare St., Suite 201, Fresno, California 93721, a joint powers Public Agency (hereafter "FCOG"), and Resource Systems Group, Inc., a New Hampshire corporation registered to do business in the State of California (hereafter "CONTRACTOR"). FCOG and CONTRACTOR are each a "Party" to this Agreement and collectively are the "Parties" to this Agreement.

WITNESSETH:

WHEREAS, it is necessary and desirable that FCOG retain a contracting firm to perform the Activity-Based Model Update 2019_ (hereafter referred to as "PROJECT"); and

WHEREAS, CONTRACTOR represents it is qualified to perform the services required for the PROJECT and is willing to perform such services pursuant to the terms and conditions stated in this Agreement; and

NOW, THEREFORE, it is agreed by FCOG and CONTRACTOR as follows:

I. CONTRACTOR'S OBLIGATIONS

A. The CONTRACTOR shall perform all work necessary to complete the PROJECT. CONTRACTOR shall perform those services as described in CONTRACTOR's Proposal: Fresno AB Model Update 2019, dated November 23,2022, (Exhibit A), attached hereto and incorporated herein by this reference as if set out in full. CONTRACTOR shall perform those tasks and services in accordance with the instructions set forth in Exhibit A. In the event of any inconsistency between this Agreement and the CONTRACTOR's Proposal (Exhibit A), such inconsistency shall be resolved by giving precedence in the following order of priority: (1) to the text of this Agreement; (2) to the CONTRACTOR's Proposal.

B. CONTRACTOR shall perform the task and services contemplated by this Agreement substantially according to the Proposed Work Schedule as set forth in Exhibit A (CONTRACTOR's Proposal), and according to the requirements of this Agreement.

C. CONTRACTOR shall perform all services required pursuant to this Agreement in the manner and according to the standards observed by a competent practitioner of the profession in which CONTRACTOR is engaged in the geographical area in which CONTRACTOR practices his profession. All products of whatsoever nature which CONTRACTOR delivers to FCOG pursuant to this Agreement shall be prepared in a substantial, first class manner and conform to the standards of CONTRACTOR's profession.

II. FCOG's OBLIGATIONS

A. FCOG shall compensate CONTRACTOR as provided in section III of this Agreement.

B. FCOG will make available to the CONTRACTOR any document, studies, or other information in its possession related to the PROJECT.

III. COMPENSATION

A. Total Compensation.

Notwithstanding any other provision in this Agreement, the basic fee for the services rendered shall be computed at the hourly and cost rates as set forth in Exhibit A (CONTRACTOR's Proposal), and shall be limited by an amount not to exceed the sum of \$111,257.

B. Progress Payments.

FCOG shall make progress payments to CONTRACTOR upon receipt and approval by FCOG of CONTRACTOR's monthly invoices, based upon completion of the task and services as set forth in Exhibit A (CONTRACTOR's Proposal). Payment of said progress payments to CONTRACTOR shall be based upon FCOG's evaluation of the completion of each respective component.

C. Invoices.

CONTRACTOR shall submit two copies of each invoice with adequate supporting documentation of work billed and costs charged by Task as set forth in Exhibit A, to FCOG, specifying those services which CONTRACTOR believes have been completed. The invoice shall specify: (1) hours worked multiplied times the billing rates authorized in Exhibit A, (2) an itemization of Other direct cost and/or subcontractor fees as set forth in Exhibit A; (3) the total amount billed for the current period, (4) the total amount billed to-date for the project. (5) the retention amount withheld. The invoice shall include a written progress report adequately describing the services billed and provided, and summarizing the status of the PROJECT in regard to task completion, timelines, and budget.

D. Payment.

Within 30 days of receipt of a proper invoice, FCOG shall determine whether CONTRACTOR has adequately performed to the satisfaction of FCOG the item(s) for which CONTRACTOR seeks payment, and shall remit payment thereof to CONTRACTOR.

E. Disputes.

If FCOG determines that CONTRACTOR has not adequately performed any such task or services, FCOG shall inform CONTRACTOR of those acts in writing which are necessary for satisfactory completion of the item(s). CONTRACTOR shall undertake any and all work to satisfactorily complete the item(s) at no additional charge to FCOG.

In the event there is a dispute over an alleged error or omission by CONTRACTOR, FCOG shall have the right to withhold payment of CONTRACTOR's fees in the disputed amount.

FCOG and CONTRACTOR shall endeavor to resolve any dispute informally between them. In the event the dispute cannot be thus resolved, either party may request the parties engage in arbitration or mediation (hereafter referred to as "arbitration") of the dispute before an independent arbitrator. In the case the parties mutually agree to arbitrate the dispute, they shall mutually select an independent arbitrator or panel of arbitrators from Judicial Arbitration and Mediation Services, Inc. ("JAMS"), or another entity mutually agreed to. In the event a panel of arbitrators is selected, each party shall select one member, and shall mutually agree on a third member of the panel. Any arbitration shall occur in Fresno County, California.

IV. TERMINATION

A. Termination Without Cause.

This Agreement may be terminated without cause at any time by FCOG or the CONTRACTOR upon thirty (30) calendar days written notice. If FCOG terminates this Agreement, CONTRACTOR shall be compensated for services satisfactorily completed to the date

of termination based upon the compensation rates and subject to the maximum amounts payable agreed to in Section III.

B. Breach of Contract.

FCOG may immediately suspend or terminate this Agreement in whole or in part, where in the determination of FCOG there is:

1. an illegal or improper use of funds;
2. a failure to comply with any term of this Agreement;
3. a substantially incorrect or incomplete report, study, or other documents or documentation submitted to FCOG;
4. improperly performed services under this Agreement.

In no event shall any payment by FCOG constitute a waiver by FCOG of any breach of this Agreement or any default which may then exist on the part of the CONTRACTOR. Neither shall such payment impair or prejudice any remedy available to FCOG with respect to the breach or default.

C. Non-Allocation of Funds.

The terms of this Agreement, and the services to be provided hereunder, are contingent on the approval of funds by the appropriating government agency. Provision of services by CONTRACTOR and reimbursement of such services by FCOG beyond June 30, 2023, are subject to the inclusion and funding agency approval of this project in the FCOG FY23-24 Overall Work Program. Should sufficient funds not be allocated, the services to be provided hereunder may be modified, or this Agreement terminated at any time by FCOG's giving the CONTRACTOR thirty (30) days advance written notice.

D. In the event of any termination of this Agreement, all finished and unfinished work materials, including, without limitation, notes, minutes, research, documents, maps, graphs, and studies, shall be FCOG's property, and at FCOG's sole option, shall be delivered by CONTRACTOR to FCOG.

V. RIGHT TO PUBLISH/OWNERSHIP OF MATERIALS

FCOG shall be the owner of all materials produced pursuant to this Agreement upon completion and full performance of this Agreement by CONTRACTOR and shall have the right to publish, disclose, distribute, and otherwise use, in whole or in part, any reports, data, or other materials prepared by CONTRACTOR under this Agreement. CONTRACTOR shall not be liable for misuse or modification beyond their control by FCOG of materials produced pursuant to this agreement.

VI. INDEPENDENT CONTRACTOR

In performance of the work, duties, and obligations assumed by CONTRACTOR to be provided under this Agreement, it is mutually expressly understood and agreed that CONTRACTOR, including any and all of CONTRACTOR's officers, agents, and employees will at all times be acting and performing as an independent contractor, and shall act in an independent capacity and not as an officer, agent, servant, employee, joint venture, partner, or associate of FCOG. Furthermore, FCOG shall have no right to control or supervise or direct the manner or method by which CONTRACTOR shall perform its work and function. However, FCOG shall retain the right to administer this Agreement so as to verify that CONTRACTOR is performing its obligations in accordance with the terms and conditions thereof. CONTRACTOR and FCOG shall

comply with all applicable provisions of law and the rules and regulations, if any, of governmental authorities having jurisdiction over matters the subject thereof.

Because of its status as an independent contractor, CONTRACTOR shall have absolutely no right to employment rights and benefits available to FCOG employees. CONTRACTOR shall be solely liable and responsible for providing to, or on behalf of, its employees all legally-required employee benefits. In addition, CONTRACTOR shall be solely responsible and save FCOG harmless from all matters relating to payment of CONTRACTOR's employees, including compliance with Social Security, withholding, and all other regulations governing such matters. It is acknowledged that during the term of this Agreement, CONTRACTOR may be providing services to others unrelated to FCOG or to this Agreement.

VII. ASSIGNMENT

CONTRACTOR shall not assign or subcontract its duties under this Agreement without the prior express written consent of the FCOG. No such consent shall be construed as making the FCOG a party to such subcontract, or subjecting the FCOG to liability of any kind to any subcontractor.

No subcontract whether existing or later entered into as set forth herein, under any circumstances shall relieve the CONTRACTOR of his liability and obligation under this contract, and all transactions with the FCOG must be through the CONTRACTOR. Subcontractors may not be changed by CONTRACTOR without the prior express written approval of FCOG.

CONTRACTOR has submitted a Proposal (Exhibit A) which names no Subcontractors.. CONTRACTOR represents and covenants by entering into this Agreement that it is the prime contractor in this Agreement, and that it is responsible for all acts or omissions of its said subcontractors. CONTRACTOR shall also be responsible for submitting invoices, in accordance with the requirements of Section 3 of this Agreement, to FCOG for work performed by the Approved Subcontractors, and shall remit payment to the Approved Subcontractors in accordance with the agreements between CONTRACTOR and the Approved Subcontractors. FCOG shall have no responsibility to provide compensation directly to the approved Subcontractors.

VIII. BINDING NATURE OF AGREEMENT; MODIFICATION

The parties agree that all of the terms of this Agreement and its Exhibits shall be binding upon them and that together these terms constitute the entire Agreement of the parties with respect to the subject matter hereof. No variation or modification of this Agreement and no waiver of any of its provisions or conditions shall be valid unless in writing and signed by duly authorized representatives of the parties. This Agreement shall be binding upon FCOG, the CONTRACTOR, and their successors in interest, legal representatives, executors, administrators, and assigns with respect to all covenants as set forth herein.

IX. INDEMNITY

CONTRACTOR agrees to indemnify, save, hold harmless, and at FCOG's request, defend the FCOG, its boards, committees, representatives, officers, agents, and employees from and against any and all costs and expenses (including reasonable attorneys fees and litigation costs), damages, liabilities, claims, and losses (whether in contract, tort, or strict liability, including, but not limited to, personal injury, death, and property damage) occurring or resulting to FCOG to the extent they are caused from any negligent, recklessness or willful misconduct of CONTRACTOR,

its officers, agents, subcontractors, or employees in their performance of this Agreement, and from any and all costs and expenses (including reasonable attorneys fees and litigation costs), damages, liabilities, claims, and losses (whether in contract, tort, or strict liability, including, but not limited to, personal injury, death and property damage), occurring or resulting to any person, firm, corporation, or entity who may be injured or damaged to the extent such injury or damage arises from any negligent acts, errors or omissions of CONTRACTOR, its officers, agents, subcontractors, or employees in their performance of this Agreement.

X. NON DISCRIMINATION AND DBE

CONTRACTOR shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. CONTRACTOR shall carry out all applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract and such other remedy as FCOG deems appropriate.

XI. INSURANCE

Without limiting FCOG's right to obtain indemnification from CONTRACTOR or any third parties, CONTRACTOR, at its sole expense, shall maintain in full force and affect the following insurance policies throughout the term of this Agreement:

- A. Comprehensive general liability insurance with coverage of not less than \$1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage.

Comprehensive general liability insurance policies shall name the FCOG, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned.

Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by FCOG, its officers, agents, and employees, shall be excess only and not contributing with insurance provided under the CONTRACTOR'S policies herein.

- B. Comprehensive automobile liability insurance with limits for bodily injury of not less than \$25,000 per person, \$250,000 per accident and for property damages of not less than \$50,000, or such coverage with a combined single limit of \$250,000.
- C. Professional liability insurance in the minimum amount of at least \$1,000,000 coverage per occurrence.
- D. Workers compensation insurance as required by law.

CONTRACTOR shall not cancel or change any insurance policy required by this Agreement without a minimum of thirty (30) days advance, written notice given to FCOG.

CONTRACTOR shall provide certification of said insurance to FCOG within twenty-one (21) days of the date of the execution of this Agreement.

Such certification shall show to FCOG's sole satisfaction that such insurance coverages have been obtained and are in full force; that FCOG, its officers, agents, and employees will not be responsible for any premiums on the policies; that as and if required such insurance names FCOG, its officers, agents, and employees, individually and collectively, as additional insured (comprehensive general liability only), but only insofar as the operations under this Agreement are concerned; that such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by FCOG, its officers, agents, and employees, shall be excess only and not contributing with insurance provided under the CONTRACTOR's policies herein; and that this insurance shall not be canceled or changed without a minimum of thirty (30) days advance, written notice given to FCOG.

In the event CONTRACTOR fails to keep in effect at all times insurance coverage as herein provided, FCOG may, in addition to other remedies it may have, suspend or terminate this Agreement upon the occurrence of such event.

XII. CONFLICT OF INTEREST

CONTRACTOR covenants that it has no interest, and will not have any interest, direct or indirect, which would conflict in any manner with the performances of the services required hereunder.

XIII. EFFECTIVE DATE, TERM

This Agreement shall become effective as of the date of the Effective Date and shall remain in full force and effect through June 30, 2024, unless sooner terminated or unless its term is extended. Upon the mutual written Agreement of the parties hereto, this Agreement may be extended beyond that date.

XIV. NOTICES

Any and all notices between FCOG and the CONTRACTOR provided for or permitted under this Agreement or by law shall be in writing and shall be deemed duly served when personally delivered to one of the parties, or in lieu of such personal service, when deposited in the United States Mail, postage prepaid, addressed to such party, at such addresses set forth below:

FCOG
Fresno Council of Governments
2035 Tulare, Suite 201
Fresno, CA 93721

CONTRACTOR
RSG
1111 6th Ave., Suite 300
San Diego, CA 92101

For all claims arising out of or related to this Agreement, nothing in this section establishes, waives, or modifies, any claims presentation requirements or procedures provided by law, including but not limited to the Government Claims Act (Division 3.6 of Title 1 of the Government Code, commencing with section 810).

XV. PROJECT MANAGER

The CONTRACTOR's project manager shall be Nagendra Dhakar. CONTRACTOR may not change its project manager without obtaining prior express written

approval by FCOG. It is understood by the parties hereto that in entering into an agreement of this type with CONTRACTOR, FCOG has taken into consideration the project team designated therein for this PROJECT, including but not limited to CONTRACTOR's designation of Nagendra Dhakar as the project manager for said PROJECT.

XVI. VENUE; GOVERNING LAW

Venue for any claim or action arising under this Agreement shall only be in Fresno County, California. This Agreement shall be governed in all respects by the laws of the State of California.

XVII. COMPLIANCE WITH LAWS

CONTRACTOR shall comply with all current Federal, State, and local laws, ordinances, and regulations applicable in carrying out its obligations under this Agreement.

CONTRACTOR agrees that Contract Cost Principles and Procedures, 48 CFR, Federal Acquisition Regulations System, Chapter 1, Part 31 et. seq., shall be used to determine the eligibility of individual items of cost.

CONTRACTOR also agrees to comply with applicable federal procedures in accordance with 49 CFR, Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

For the purpose of determining compliance with Public Contract Code 10115, et seq. and Title 21, California Code of Regulations, Chapter 21, Section 2500 et seq., when applicable, and other matters connected with the performance of the contract pursuant to Government Code 8546.7, the CONTRACTOR, contractor's subcontractors, and the FCOG shall maintain all books, documents, papers, accounting records, and other evidence pertaining to the performance of the contract, including but not limited to, the cost of administering the contract. All parties shall make such material available at their respective offices at all reasonable times during the contract period and for three years from the date of final payment under the contract. Any duly authorized representative of the FCOG, the state, or federal government shall have access to any books, records, and documents that are pertinent to the contract for audits examinations, excerpts, and transactions, and copies thereof shall be furnished if requested.

Any costs for which payment has been made to CONTRACTOR that are determined by subsequent audit to be unallowable under 48 CFR, Federal Acquisition Regulations System, Chapter 1, Part 31 et seq., or 49 CFR, Part 18 Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments, are subject to repayment by CONTRACTOR to FCOG.

Travel expenses and per diem rates are not to exceed the rate specified by the State of California Department of Personnel Administration as specified by the California Department of Transportation's Travel Guide at the following link; <http://www.dot.ca.gov/hq/asc/travel/> unless written verification is supplied that hotel rates were not then commercially available at the time and location required.

Any subcontract entered into by CONTRACTOR as a result of this contract, shall contain all of the provisions of this article.

XVIII. CONTRACTOR'S LEGAL AUTHORITY

Each individual executing or attesting this Agreement on behalf of CONTRACTOR hereby covenants, warrants, and represents: (1) that he or she is duly authorized to execute or attest

and deliver this Agreement on behalf of such corporation in accordance with a duly adopted resolution of the corporation's board of directors and in accordance with such corporation's article of incorporation or charter and bylaws; (2) that this Agreement is binding upon such corporation; and (3) that CONTRACTOR is a duly organized and legally existing corporation in good standing in the State of California.

XIX. NO THIRD PARTY BENEFICIARIES

Notwithstanding anything else to the contrary herein, the Parties acknowledge and agree that no other person, firm, corporation, or entity shall be deemed an intended third-party beneficiary of this Agreement.

XX. SEVERABILITY

In the event any provisions of this Agreement are held by a court of competent jurisdiction to be invalid, void, or unenforceable, the Parties will use their best efforts to meet and confer to determine how to mutually amend such provisions with valid and enforceable provisions, and the remaining provisions of this Agreement will nevertheless continue in full force and effect without being impaired or invalidated in any way.

XXI. HEADINGS; CONSTRUCTION; STATUTORY REFERENCES

The headings of the sections and paragraphs of this Agreement are for convenience only and shall not be used to interpret this Agreement. This Agreement is the product of negotiation between the Parties. The language of this Agreement shall be construed as a whole according to its fair meaning and not strictly for or against any Party. Any rule of construction to the effect that ambiguities are to be resolved against the drafting Party shall not apply in interpreting this Agreement. All references in this Agreement to particular statutes, regulations, ordinances or resolutions of the United States, the State of California, or the County of Fresno shall be deemed to include the same statute, regulation, ordinance or resolution as hereafter amended or renumbered, or if repealed, to such other provisions as may thereafter govern the same subject.

XXII. DRUG FREE WORK PLACE

CONTRACTOR shall certify compliance with Government Code Section 8355 pertaining to providing a drug-free workplace per Exhibit B - "Drug Free Workplace Certification", attached hereto and incorporated herein by this reference as though set forth in full.

XXIII. FEDERAL FUNDS

CONTRACTOR shall acknowledge the participation of federal funds in this PROJECT by causing to have printed on the cover page of any final document provided subsequent to this Agreement, "The preparation of this report has been financed in part through grants from the United States Department of Transportation".

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XXIV. INTEGRATED AGREEMENT

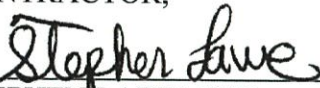
This Agreement, and Exhibits A through B, attached hereto and incorporated herein by this reference, represents the full and complete understanding of the Parties with respect to the subject matter hereof, and all preliminary negotiations and oral or written agreements with respect thereto are merged herein. No verbal agreement or implied covenant shall be held to vary the provisions hereof.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the Effective Date.

FRESNO COUNCIL OF GOVERNMENTS

By 
TONY BOREN, Executive Director

CONTRACTOR,

By 
STEPHEN LAWE, CEO

APPROVED AS TO LEGAL FORM ON BEHALF OF THE FCOG:
DANIEL C. CEDERBORG, County Counsel

By  E-Signed by
BRYAN D. ROME, Deputy County Counsel Bryan Rome
Jan. 30, 2023

SCOPE OF WORK

SUBMITTED TO: Kristine Cai, Fresno COG via Email

SUBMITTED BY: Nagendra Dhakar, Mark Bradley, Hannah Carson RSG

CLIENT: _____

DATE SUBMITTED: November 23, 2022

RSG PROJECT #: _____ TASK ORDER #: _____

CLIENT PROJECT #: _____ VERSION #: 4

PROJECT TITLE: Fresno AB Model Update 2019

The project will update the Fresno AB model to reflect 2019 base year conditions. The model update will include the following tasks.

TASK 1: Project Management

RSG team will hold bi-weekly conference calls with FresnoCOG to discuss progress in the previous period and issues that may be encountered. RSG will prepare monthly invoices and progress reports.

Deliverables:

- Meeting notes
- Monthly invoices and progress reports

TASK 2: Update Model Inputs

This task will update AB model inputs for the 2019 base year. We will update the following inputs:

1. **Networks.** The Fresno AB model uses three networks: highway, transit, and bike. The current highway and transit networks represent 2017 details with all future year projects coded. FresnoCOG will review the networks and update as necessary to include 2019 and future year details. FresnoCOG will compare the bike network with the latest regional bike map and/or open street map (CyclOSM¹) and update as necessary to prepare it for the 2019 conditions. RSG will provide support in reviewing and coding network details.
2. **MAZ Land Use Data.** The model requires the following land-use information for each MAZ: number of households, employment in 9 DaySim categories,

¹ <https://www.cyclosm.org/#map=15/36.8425/-119.7958/cyclosm>

enrollment in 3 categories, off-street parking capacity and cost (daily and hourly). The first three datasets (households, employment, and enrollment) are already available for 2019, however, FresnoCOG will review and validate them with other data sources. For parking data, FresnoCOG will look for freely available data sources and convert the data into format required in the model. RSG will provide support in reviewing and advising in preparing data in model input formats.

3. **Synthetic Population.** PopulationSim generates synthetic population files that are input to the DaySim model. The population files include a household file and a person file. The following are primary inputs to the PopulationSim process: seed data, household controls, and non-institutional group quarters (GQ) controls. FresnoCOG will provide total households and total non-institutional GQs by MAZ. FresnoCOG will update the PopulationSim process to use 2015-2019 PUMS as seed data and 5-year 2015-2019 ACS for marginal distributions. FresnoCOG will run the updated PopulationSim and generate synthetic population files in DaySim format. RSG will provide guidance to FresnoCOG in working with PopulationSim and review output population files.
4. **Workers IXXI Fractions.** DaySim requires the share of county workers working outside the county (IX) and share of employment occupied by outside county workers (XI) for each TAZ. RSG will use the 2019 LODES data to develop these fractions in the format required in DaySim.
5. **Park and Ride.** DaySim expects an input file listing park ride locations with the zone id, parking capacity, and cost. FresnoCOG will prepare this input file in the required format. RSG will provide guidance.
6. **External Auto Demand.** The external auto demand are fixed matrices input to the model. Presently, they are developed using the California Statewide Model. RSG will assist FresnoCOG in developing these input matrices from passive big data. FresnoCOG will purchase passive big data. RSG will provide guidance and support to FresnoCOG in processing the big data to convert into matrix trip tables required in the model system.
7. **External Truck Demand.** The external truck demand are fixed matrices input to the model. The present AB model system uses truck matrices from 2007 and 2040 as inputs, which are then used internally to interpolate demand for the scenario year. RSG will assist FresnoCOG to create the external truck demand from the passive dataset. FresnoCOG will purchase passive big data. For future scenarios, the external truck demand will be based on the base year external truck demand and the demand growth calculated from the California Statewide Model. The growth seen in the Statewide Model will be subjected to reasonable checks and adjusted to land use assumptions as necessary.



RSG will update the AB model with the updated inputs and run the model to verify successful completion. RSG will review results for higher level demand and assignment summaries. If issues are discovered, FresnoCOG will review and update model inputs.

Deliverables:

- Updated model inputs
- Updated model setup on GitHub

TASK 3: Model Enhancements

RSG will add the following enhancement to the Fresno AB model:

1. **Telecommute model.** We recently implemented and estimated a telecommute model for SACOG. We will transfer the estimated parameters from SACOG and implement the telecommute model in the Fresno AB model system.
2. **New Modes (TNC).** We will update the DaySim model to include transportation network companies (e.g., Uber, Lyft) as a new transportation mode. We will also make changes to the trip building step to include vehicle demand from the new mode. If desired, we will update the assignment step to add a new class for the new mode.
3. **Update Cube Software.** RSG will assist FresnoCOG in updating the Fresno AB model system to be compatible with the latest version of Cube Software. FresnoCOG will test the model with the new software and RSG will provide support in this effort including helping reach out to Bentley support if needed.
4. **Other Enhancements.** RSG will make other enhancements to the Fresno AB model system. The updates will include the following:
 - a. Update SB375 VMT calculations - SB 375 includes both passenger cars and light duty trucks. The SB 375 VMT should include II, IX & XI trips made by both residents and non-residents. The IXXI VMT should only include VMT within our county boundary. In summary, SB375 VMT should include:
 - i. Resident trips (DaySim) – II trips made by residents
 - ii. External auto trips (IX, XI) – trips by Fresno residents and outside residents
 - iii. External truck trips (IX, XI) – only light duty
 - iv. Internal truck trips (II) – only light duty
 - b. Align VMT summaries from two different spreadsheets - *_Roadway_SummaryCombined.xlsx and 1_Inputs_Support\Validation\hwy_validation_vmt_11112018_final.xlsx
 - c. Update the model to run in one click from the Cube catalog

- d. Clean up the setup to keep only relevant inputs and catalog keys
- e. Automate Daysim input keys. E.g., the keys for the parcel and the PopSim inputs (household and person) files so that those input files can be made year specific.
- f. Add DaySim summaries to the model flow

Deliverables:

- Updated model setup on GitHub

TASK 4: Model Calibration

RSG will calibrate the model using household travel survey and Census data. The model calibration will be performed in conjunction with the model validation (described in the next task).

RSG will use the 2017 NHTS for DaySim demand calibration. The NHTS included 609 households in Fresno County. Of these, 189 households were collected on weekends, leaving only 420 households (weekday travel) for model calibration. We propose utilizing the data from the entire SJV for the model calibration. This would increase our weekday sample size from 420 households to 1,727 households. Given that the Fresno AB model does not have zone system outside the Fresno County, we will use the entire SJV data for calibrating patterns where zone systems are not required (e.g., number of tours, number of trips, mode choice, time of day) and use Fresno County specific data for tour and trip length calibrations that would need the zone system.

The 2017 NHTS data is already weighted, however, it was not weighted for Fresno County population excluding the weekend sample, so RSG will re-weight the Fresno County data using 2019 demographics data from Fresno COG and ACS. We will also re-weight the valley-wide data using controls calculated from 2019 ACS PUMS. At the time of re-weighting, we will process the data and convert into DaySim format to prepare for model calibration and ensure that the weighted Fresno County NHTS records used for calibration are consistent with the synthetic population used as model input.

We will also utilize other observed sources, such as big passive data, commute flow patterns from LEHD Origin-Destination Employment Statistics (LODES), and auto ownership from ACS. In absence of a transit on-board survey, we will use the 2019 observed transit boardings to infer transit travel for mode choice targets.

Deliverables:

- Processed 2017 NHTS data for 8 SJV counties in DaySim format
- Final calibration summaries
- Updated setup on GitHub



TASK 5: Model Validation

RSG will use the observed traffic counts and transit boardings to validate model assignment flows. FresnoCOG will assemble observed traffic counts and join them to the model network. The counts will include the following segments: autos, trucks, screenlines, and external stations. FresnoCOG will obtain regional 2019 VMT from the HPMS. FresnoCOG will obtain transit ridership by route from transit operating agencies and convert into the format required for transit validation. RSG will provide guidance in developing validation datasets and support in review.

RSG will use these datasets to validate the model assignment flows and make necessary adjustments to improve validation results. FresnoCOG will support RSG in the model validation by reviewing network attributes, land use data, and observed validation data.

Deliverables:

- Traffic counts
- Transit boardings
- Final validation summaries
- Updated setup on GitHub

TASK 6: Model Documentation

RSG will prepare a project report describing model updates and other tasks performed under this task order. RSG will also update the GitHub wiki with up-to-date documentation.

Deliverables:

- Project report
- Updated GitHub wiki

Table 1, Table 2, and Table 3 provide project staff rates, estimated budget, and schedule respectively. The total budget is at \$111,257.

TABLE 1: PROJECT STAFF RATES

STAFF	TITLE	LOADED HOURLY RATE
Nagendra Dhakar	Project Manager	\$189.86
Mark Bradley	Technical Advisor	\$363.78
Hannah Carson	Analyst	\$137.09

TABLE 2: PROJECT BUDGET

		RSG			Total Hours	Total Cost
Task	Task Descri	Nagendra Dhakar (Project Manager)	Mark Bradley (Technical Advisor)	Hannah Carson (Analyst)		
	Hourly Rate	\$ 189.86	\$ 363.78	\$ 137.09		
1	Project Management	24	4	34	62	\$ 10,673
	Conference calls (upto 20)	20	4	20	44	\$ 7,994
	Other project management	4		14	18	\$ 2,679
2	Update Model Inputs	26	0	76	102	\$ 15,355
	Networks	2		4	6	\$ 928
	MAZ land use data	4		12	16	\$ 2,405
	Synthetic population	4		12	16	\$ 2,405
	Workers ixii fractions	2		12	14	\$ 2,025
	Park and ride	2		0	2	\$ 380
	External auto demand	4		10	14	\$ 2,130
	External truck demand	4		10	14	\$ 2,130
	Run model with updated inputs	4		16	20	\$ 2,953
3	Model Enhancements	24	0	100	124	\$ 18,266
	Telecommute model	2		12	14	\$ 2,025
	New modes (TNC)	4		20	24	\$ 3,501
	Update Cube Software	2		8	10	\$ 1,476
	Other, as needed	16		60	76	\$ 11,263
4	Model Calibration	32	66	96	194	\$ 43,246
	Develop survey data (2017 NHTS)	8	60	14	82	\$ 25,265
	Develop other observed data (e.g., lodes, census, big data)	8	2	22	32	\$ 5,262
	Calibrate	16	4	60	80	\$ 12,718
5	Model Validation	21	0	88	109	\$ 16,051
	Develop observed traffic counts	4		24	28	\$ 4,050
	Develop transit boardings	1		4	5	\$ 738
	Validate	16		60	76	\$ 11,263
6	Model Documentation	12	2	34	48	\$ 7,667
	Project report	8	2	24	34	\$ 5,537
	Update wiki	4		10	14	\$ 2,130
TOTAL	Model Update 2019	139	72	428	639	\$ 111,257

TABLE 3: PROJECT SCHEDULE

Task	Task Description	Start	End	2022		2023							
				Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	Project Management	Nov-22	Oct-23										
2	Update Model Inputs	Nov-22	Feb-23										
3	Model Enhancements	Nov-22	Feb-23										
4	Model Calibration	Jan-23	May-23										
5	Model Validation	Apr-23	Jul-23										
6	Model Documentation	Jul-23	Aug-23										

